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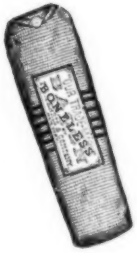

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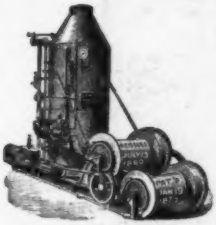

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VOL. XV. JANUARY, 1894. NO. LXVII.

Prize Essay.

THE NICARAGUA CANAL IN ITS MILITARY ASPECTS.

BY CAPTAIN GEORGE P. SCRIVEN, SIGNAL CORPS, U. S. A.

"The natural interest of the United States in any connection through the American Isthmus has not only been always emphatically expressed by the government, but it has been fully and distinctly recognized by other governments from the earliest period of our national existence."

W. M. EVARTS, *when Secretary of State.*

SINCE the days when Columbus, broken in hope and spirit by his failure to find a westward passage to the Indies, returned from the last unsuccessful voyage along the coast of Veragua, to die unheeded in Spain, the American Isthmus has stood a barrier against the commercial intercourse of the world.

At first it was thought that nature could not have placed this narrow, unbroken wall of land between the waters of the two great seas, and the early Spaniards, stimulated by the discoveries of Balboa and by the magnificent successes of Magellan, searched diligently for a passage to the Pacific. The shores of the Gulf of Mexico were traced around every bay and indentation, each inlet of the Spanish main was examined, and the coast of the Pacific was followed from Panama to California, before it was proved beyond a doubt that the western passage to the Indies was indeed but the "chimera of a splendid imagination."

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But long before the quest had been abandoned and almost a century before the English had learned that China could not be reached by the way of a Virginia creek, the Spaniards had established inter-oceanic communication on the isthmus; and the trains of those wonderful gold-seekers loaded with the merchandise of Peru were crossing America from Panama to Porto Bello. But an easier passage was demanded, and while the grandson of Ferdinand and Isabella was still upon the throne, learned men of Spain * abandoning the hope of a natural passage between the oceans, had conceived and advocated the idea of constructing an artificial waterway across one of the three routes—Tehuantepec, Nicaragua, and Panama—whose relative advantages have fixed the attention of scientific men down to our own days.

But the era of the search for the "Secret of the Strait," was that of greatest activity in geographical enterprise; it was followed in tropical America by a neglect that lasted from the days of Philip to the beginning of the present century.

From the northern shores of the Mexican gulf indefinitely southward, the continent had fallen under the control of Spain, and Spain lay benumbed beneath the weight of that line of weaklings who followed in pitiable diminuendo, after the mighty Charles and his gloomy son. It is true that the idea of cutting a waterway through the isthmus still occupied the minds of men, but it was ever growing weaker and more hazy and finally disappeared amidst the darkness of bigotry and clouds of war that closed over Spain towards the end of the sixteenth century,

To the race of grand adventurers who first set foot on American shores, to Balboa, Ponce de Leon, Pizarro, Cortez, and a hundred others, there succeeded a horde of smaller robbers, who, as privateers, buccaneers, or plain pirates, stole from friend and foe alike, and by making the Spanish main and its adjoining seas a terror to the world, did more to retard than to advance the cause of American progress.

And so for two hundred years little was added to the geographical knowledge of the central regions of this continent, and little thought given to inter-oceanic communication, until Humboldt, early in the present century, again brought the subject before the world. But the moribund hand of Spain still lay upon

* Notably Gomara, who as early as 1551, "Urged on Philip II. the union of the Oceans." See MSS. of Prof. J. E. Nourse, quoted in Sullivan's "Problem of Inter-oceanic Communication," etc.

the greater part of America and was not to be shaken off until revolt had followed revolt from the Sabine* to the Rio de la Plata, and the events of the early years of this century had forever lost to Spain the great world which Columbus had given to her. Then it was that the idea of an artificial waterway was again taken up, and the states of the Central Republic, in whose territory one, at least, of the "historic" canal routes lay, began to consider the problem for themselves, and the modern era of thought and discussion began.

To trace here in detail the course of this thought, and to outline the forms of its expression would be tiresome and out of place. Suffice it to say that in the half century intervening between the independence of Spanish-America and the era of scientific investigation of the isthmus, there were few countries of Europe that did not show interest in the problem of "trans-isthmian" communication.

Spain, Holland, France, England and Belgium, all had made attempts more or less serious to enter upon the work, either as governments, or by associations of their citizens. New Granada and the Central American states had been going up and down the world crying their concessions to any buyer, much as they do to-day, while languid Mexico had made some feeble attempts to explore her own territory of Tehuantepec, and even Holy Rome had been asked to help the good work on.

Meantime the United States had talked much about an American canal, and had discussed largely the various routes proposed between Coatzacoalcos and the Atrato, but she had not been content with words alone and had sent the officers of her army and navy to investigate the actual difficulties involved in isthmian transit.

The army had found a road to the Pacific.† The navy through the gallant expedition of Strain and his men, had added one star more to her galaxy of glory. A citizen of New York, Mr. Kelly, had given his money and his efforts to the investigation of the Atrato route, and Childs had discovered the true "break in the Cordilleras."

But these, like many more of the earlier attempts to solve

* The boundary between the United States and the territory of Spain as settled by the Florida treaty of 1819.

† Colonel Hughes, United States Topographical Engineers, who made the final surveys for the location of the Panama railroad.

the problem of the Isthmus, though admirable in themselves, had not gone far towards establishing the practicability of a water-way. Little had been accomplished towards the selection of a route, and few lessons could be drawn from the incomplete surveys. Indeed the history of the explorations of the Isthmus from the earliest times down to the year 1870, is hardly more than a record of individual, unscientific, and partial efforts.

During these experimental years, the attitude of the United States, like that assumed to-day, was one of watchful non-interference in schemes that had not taken form, and in canals that were constructed only on paper. Nevertheless, her interests in all plans for crossing the Isthmus had been clearly announced.

One of the first acts of the Central American Republic, after independence, was to ask aid of the United States in this work, and as early as 1826, our interest was acknowledged. Again, in 1839, it was unmistakably proclaimed by Mr. Mercer in his report to the House of Representatives.

But undoubtedly the strongest evidence of the early interest of this country in a line of transit between the two oceans, is the treaty of 1846 with New Granada, by which the "United States guaranteed positively and efficaciously, the perfect neutrality of the Isthmus." This would probably be looked upon to-day as a dangerous and entangling alliance by statesmen of a certain school, yet it has proved an alliance from which nothing but good has come in the almost fifty years of its existence.

But the European world in the meantime was also interested in canal construction, and was engaged in more or less active co-öperation. England, however, our arch-rival in America, seemed to be an idle, if interested spectator. But this attitude was a mere seeming, and England was in reality busy in obtaining from corrupt officials and from drunken natives claims to American territory, which, though shadowy in fact, were sufficiently real in appearance to give a claim to British interference in Central American affairs.

Her encroachments had been noted in France as early as 1843, and M. Guizot, before the Chamber of Deputies in that year, in speaking of the important effect that an American canal must have upon the commercial relations of Europe, warned France against remaining inactive in view of the threatened policy of occupation in Central America then pursued by England. But the warning seems to have passed unheeded both in France and

in the United States until some few years later it was found that these same shadowy English claims to Mosquito territory were proving formidable obstacles in the way of an American company which then proposed to construct a canal across Nicaragua; thereupon followed the much discussed and still embarrassing Clayton-Bulwer treaty of 1850.

From the consequences of British meddling it is by no means certain that the United States is yet free.

* * * * * * *

The beginning of the era of real progress towards the construction of an interoceanic canal dates back hardly more than twenty years, and was due to the clear-headed and far-sighted policy of General Grant, then President of the United States. Incited to an interest in the question by Admiral Ammen, of the United States Navy, who had made the transit of the Isthmus his life's study, General Grant, when Commander-in-Chief, in a letter concerning a canal to Rear-Admiral C. H. Davis, U. S. Navy, said: "I firmly believe the scheme practicable, and if it is, there is no doubt but that in this age of enterprise, the work will be done. I regard it as of vast political importance to this country that no European government should hold such a work." But lack of knowledge was still the barrier to all exact plans, for so little was really known about the Isthmus that the same Admiral Davis, in reply to a resolution of Congress, makes, in 1866, the remarkable statement that: "There does not exist in the libraries of the world the means of determining even approximately, the most practical route for a ship canal across the Isthmus."

And so it happened that in March, 1872, General Grant, in accordance with an act of Congress, appointed a commission consisting of Brig.-General A. A. Humphreys, Chief of Engineers, U. S. Army; Prof. C. P. Patterson, Superintendent U. S. Coast Survey, and Admiral Daniel Ammen, Chief of the Bureau of Navigation, to consider the subject of communication by canal between the waters of the Atlantic and Pacific oceans.

It was under the direction of this commission that the first really scientific, general explorations of Central America were undertaken.

The first party to enter the field was that of the Darien Expedition, under charge of Commander Selfridge, U. S. Navy, and its work was carried on by one party or another for the five years from 1870 to 1875. A second expedition under Capt. Shufeldt

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undertook the survey of the Isthmus of Tehuantepec; while a third, first under Commanders Crossman and Hatfield, then under Captain Lull, was sent to examine again the Nicaragua route already carefully surveyed by Childs.

This series of explorations, undertaken by the officers of the United States Navy, terminated with surveys of the Panama and San Blas routes. After this a long and careful study was made of the results, and on February 7, 1876, the commission reported unanimously in favor of a line from Greytown to Brito, across the territory of Nicaragua, as the most favorable route for a canal between the Atlantic and Pacific oceans.

So it may be said that the Nicaragua route is that selected by the United States for an American canal.

However, this decision of the commission did not settle the matter in Europe, and in 1876 an officer of the French navy, Lieut. L. B. Wyse, was sent to Central America to make further explorations, under the auspices, not of the French government, but of the "Société Internationale du Canal Interocéanique." It is probable that these surveys were partial and unreliable, but they resulted in the selection of two routes through Colombian territory which were again examined in 1877–78. Early in the latter year a concession was given to a French company by the United States of Colombia, embracing the entire territory of that country and covering all proposed routes for a canal, except those through Nicaragua and Tehuantepec.

To these efforts of Lieut. Wyse succeeded the Paris conference of which M. deLesseps was president, and on May 29, 1879, it was declared that:

"The Conference deem the construction of an inter-oceanic canal, so desirable in the interests of commerce and navigation, is possible, and in order to have the indispensable facilities of ease of access and of use, which a work of this kind should offer before all others, it should be built from the Gulf of Limon to the Bay of Panama."

The story of the attempt to build this canal at Panama, from its vain-glorious beginning, through its extravagant and reckless continuation, to its criminal close, is too well known to need recital here. It is probable that generations of men will come and go before the lessons are forgotten and before another spade full of earth is removed by France from the soil of the American Isthmus.

But while the eyes of the world were fixed on Panama, the United States was quietly continuing its investigations in Nicaragua, and in 1884 a treaty was arranged between this country and Nicaragua, by which it was provided that the construction of a canal should be undertaken by the former government, and Mr. A. G. Menocal, U. S. Navy, already frequently employed in the surveys of this route, was sent to make additional investigation.

But the treaty of 1884, after having been submitted to the Senate of the United States was withdrawn by the President, Mr. Cleveland, and in 1887 the Republic of Nicaragua granted a concession to build the canal to an association of citizens of the United States, called the Nicaragua Canal Association. From this association was organized, under the laws of the State of Colorado, a construction company; then a company called the Maritime Canal Company of Nicaragua was chartered by Congress February 20, 1889; and this Maritime Canal Company, by contract with the Construction Company, is now building the canal across Nicaragua. The Republic of Costa Rica afterwards assented to the arrangement, so far as her interests were concerned.

The concession granted to the Nicaragua Canal Association, provided for the exclusive privilege to build and operate the canal for ninety-nine years, and further that the people of all nations shall be invited to contribute capital.

From the articles of the concession referring to neutrality and defense (too long to be quoted here) it appears that the neutrality of the canal is, in the first instance, guaranteed by Nicaragua alone; but this guarantee is supported by a kind of hazy assumption that additional security will be thrown around the canal at some future time by some action of one or more of the great powers.

The canal is to be closed only "to vessels of war of such powers as may be at war with Nicaragua or with any other of the Central American republics."

The police protection is left to Nicaragua and the company. It is probable that the weak and vague safeguards granted by the concession cannot remain satisfactory to the builders and owners of this great work after it shall have been completed; nor could they be satisfactory to the United States. But it may be assumed that before the canal is completed the great nations of the

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world will have come to an understanding in regard to the status of this highway. What that status may be, it shall be my endeavor to show.

* * * * * * *

Such is an outline of the attempts made to solve the problem of interoceanic communication from the earliest efforts of civilized man to the scientific investigations of the past twenty years, and the French failure of to-day. The problem has belonged to all nations, yet none has done so much towards its solution by persistent effort and systematic research as the United States.

The line chosen by her officers in 1876 remains to-day the only one that attracts the serious attention of the world. Panama is a failure; Tehuantepec has long since been abandoned as a possible route, and there remains but Nicaragua to realize the old dream of a waterway across America—a western passage to the Indies.

But great as is the historical interest of the United States in the Nicaragua Canal, her other interests are far greater. They are manifold, and though it is with the military aspect of the waterway that this paper is chiefly concerned, both the commercial and political aspects are so intimately connected with the military that a glance at each may well be given.

It has been asserted* that the commercial interest of the United States in a canal between the Atlantic and Pacific oceans is greater than that of any other country of the world. But it is not probable that this claim will be unreservedly admitted by Europe, and certainly not by England, in view of the great advantages a canal will give to her trade with South America and with the Pacific colonies, and of her heavy preponderance of ocean tonnage. But the claim will probably prove true for the time and conditions existing when the canal shall have been built.

At present more than one-half of the sea-going tonnage of the world sails under the British flag,† less than one-tenth (8.22%) carries American Register, while the Norwegians come third, with 7.17%; Germany fourth, with 7.07%; France fifth, with 4.71%; and Spain sixth, with 2.41%. The percentage of the world's tonnage belonging to Mexico, Central and South America is, all told, less than one fiftieth of the whole (1.7%), divided as follows: Mexico

*By no less authority than a President of the United States, Mr. Hayes, in his message to Congress, March 8, 1880.

†52.34%. See tables Lloyd's Register Book, 1889.

.04%, Bolivia .01%, Brazil .67%, Argentine .19%, Chile .64%, Peru .04%, Uruguay .05%, Venezuela .01%, and the remaining countries so small as to be unnecessary to note.

In other words, the flags of the great nations of Europe float over nearly nine-tenths of the sea-going tonnage of the world, while those of the countries of this continent cover something less than one-tenth. If these figures alone are considered, it should seem that our claim to paramount commercial interest is little more than a boast; and that Europe, or even Great Britain alone, has a greater interest in the Nicaragua Canal, or in any other ocean communication of the globe, than have the United States and all the other nations of America combined. But the mere tonnage of vessels belonging to different countries is not the only factor to be considered.

For instance, many of the English ships whose tonnage goes to swell the total are engaged in coasting trade, and would never enter the canal at all, while nearly all of our own coasters as well as our foreign traders would use it constantly. Again, if we compare the values of foreign commerce (*i. e.*, the general imports and exports of merchandise) of the leading commercial nations of the world, we find the annual average of the general imports and exports combined for the ten years 1880-1890, valued in dollars: United Kingdom, $3,364,546,665; Germany, $2,216,804,654; France, $1,914,474,639; United States, $1,465,805,561; Spain, $298,588,700. Which shows the United States to have held fourth place in the world's commerce, during the past decade, but with a commerce on the part of the United Kingdom less than two and a half times our own, instead of five times, as was the case of the relative tonnage of the two countries. Besides this is the fact that the percentage of increase in the yearly average for these ten years over the yearly average for the years 1871-1880, shows for the United Kingdom, 6.50; for Germany, 10.29; for France, 6.48; for the United States, 26.15; for Spain, 52.80; which indicates that the commerce of the United States with the world is growing more rapidly than that of any of the countries given, except Spain; and that the United States has increased her trade nearly four times as rapidly as has the United Kingdom, or France, and about two and one half times as rapidly as Germany, while Spain shows a still more remarkable increase.

It is evident, then, should this growth continue, that the United States will not long find it profitable to remain without a

larger merchant marine, or to leave her carrying trade to other nations. It is clear also that figures based upon the world's tonnage of to-day are a most untrustworthy guide to the conditions that will exist when a canal across the Isthmus is completed. Such a canal will, of necessity, increase the trade of the United States between the Atlantic and Pacific ports, as well as the trade of these ports with Central and South America, with Mexico, and, only to a less degree, with other countries of the world. Our possessions on the Pacific coast are indeed, "Imperial in extent and of extraordinary growth. Even at their present stage of development they would supply the larger part of the traffic which would seek the advantages of the canal. The states and territories appurtenant to the Pacific Ocean and dependent upon it for commercial outlet, and hence directly interested in the canal, comprise an area of nearly eight hundred thousand square miles, larger in extent than the German Empire and the four Latin countries of Europe combined."*

These and similar considerations no doubt justify the claims of the United States to a greater commercial interest in the canal than that of any other nation of the world, and no one who does not believe that this country is going to sink to commercial insignificance amongst nations, can doubt that the day will come, and come quickly, when we shall wrest from England a part of her carrying trade upon the ocean, and shall take our rightful place amongst the trading countries of the world—perhaps the first.

* * * * * * *

But great as is the commercial importance to the United States of a canal across Nicaragua, its relations to her defense and to her safety as a nation are far more considerable.

The commercial value of the waterway is at least shared by the world; but the strategic value, so far as it relates to home defense, concerns only the nations of the western continent; and of these virtually the United States alone as the one power which has, or is likely to have, ships that can use it.

There can be no excuse for a failure on the part of this government to realize the great military value of the canal to the defense of the coasts of the United States, for it has been announced by a President in his message to Congress in words that are worthy the attention of every American: "An interoceanic

*Mr. Blaine, 1881.

canal across the American Isthmus will essentially change the geographical relations between the Atlantic and Pacific coasts of the United States, and between the United States and the rest of the world.

"It will be the great ocean thoroughfare between our Atlantic and Pacific shores, and virtually a part of the coast line of the United States.

"Our merely commercial interest in it is greater than that of all other countries, while its relation to our power and prosperity as a nation, to our means of defense, our unity, peace and safety, are matters of paramount concern to the people of the United States."*

The truth of these words ought to be evident to us all, but it is probable that the apathy with which we, as a nation, look upon all matters relating to our own safety, will prevent this aspect of the Nicaragua Canal from being considered. We have fought the great war of modern times: we have had millions of men under arms in the field, our military power on land is without limit, therefore we are unconquerable,—such is the reasoning. But we forget that the United States is by nature and by neglect one of the most vulnerable nations of the world, and that no great power has so vast an extent of frontier exposed to the attack of an enemy.

The Atlantic seaboard from Quoddy Head, Maine, to Cape Florida, is 2043 statute miles; the Gulf coast from Cape Florida to the Rio Grande is 1852 miles; while the Pacific coast line from the Mexican boundary to the Straits of Fuca and including the Straits to Race Rock Lights is 1810 miles.†

Along the Atlantic coast are scattered thirty-two cities of over eight thousand inhabitants,‡ cities which are directly exposed to bombardment from hostile ships; without considering the hundreds of others that could be attacked by light draught boats, or

*Mr. Hayes in his message to Congress, March 8, 1880.

†I owe these figures to the courtesy of the Superintendent of the Coast and Geodetic Survey, by whom the following additional figures are given. The line of the coast of Alaska from the Portland canal, including the Aleutian Islands, Behring Sea and the Arctic Ocean to the 141st meridian is 4750 statute miles. Including the indentations along the coasts to the head of tide water the lengths are, for the Atlantic coast 36,607 statute miles; for the Gulf coast 19,293 miles; and for Alaska 26,376 miles. Total 82,276 miles.

‡See Report of the Board on Fortifications, and Census Bulletin, No. 52, April 17, 1891.

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reached by land attack directed from shipping; or, still others of smaller population but containing considerable wealth. Along the Gulf coast there are five cities of over eight thousand people directly exposed to bombardment from the water, while on the Pacific there are four.

Besides these places, so temptingly inviting destruction, there are, of course, along this long line of coast, scores of bays and inlets that would furnish a safe shelter for an enemy's ships operating against us.

On all our coast line we have land defenses at only thirty-two points, and those are in most cases old, obsolete, and so weak in armament as to be hardly worth taking into account.

These old and well-known truths would hardly be worth statement here were it not for the fact that they bear directly upon the military aspect of the canal and that they will probably remain unchanged for many years to come, for the United States moves slowly in these matters. But even were it otherwise and were the greatest efforts made by the Government to protect our sea-coast by land defenses, such defenses could and would be placed only at the principal harbors, and the general protection of our coasts against foreign attack be necessarily left to the navy.

Without accepting for a moment the sweeping statement advanced by the Navy* that, "If a navy is made thoroughly competent for its work, no other defense for a coast will be called into play, and if it is incompetent no other defense can prevent a disaster to the coast," it is evident that the defense of such a great length of coast as our own, marked throughout with excellent harbors, and thriving cities, must be left mainly to the floating defenses. Land works cannot be built at all the vulnerable points. Even to protect by floating batteries this line of coast would require an enormous number of ships. Here we are confronted by probable rather than by desirable conditions, and in considering a conflict with a great European power must look upon our naval defenses from the point of view of the numerically weaker.

At present we have a navy of which we, as a nation, are learning to be proud; a navy gaining constantly in the regard of the world, and one that will receive, in future, the aid and encourage-

*See, "The Year's Naval Progress," 1891, p. 379. The views are those of an individual, nevertheless they appear clothed with the authority of the Office of Naval Intelligence.

ment necessary to plant it, ship for ship, abreast, perhaps ahead, of any navy of the world.

But there can be no doubt that the United States will never wish, as she shall never need, to rival in peace the great military establishments of Europe either on sea or on land. Her policy will be to maintain for the purposes of national defense, a small, but perfectly disciplined, armed, and equipped force on land; and on the the ocean a small fleet of swift and powerful ships which shall carry her flag with honor upon every sea.

It is true that we have risen, as a naval power, from the disgraceful position of nineteenth which we held in 1886, with only Peru and Mexico below us, and such countries as China, Turkey, Greece, and Portugal above; but even when the vessels now authorized or building are completed, the United States will rank as a naval power only seventh amongst the nations of the world, with Great Britain, France, Italy, Russia, and even Spain above her.*

RANK OF THE U. S. NAVY.

Doc. House of Representatives, 52d Congress, 2d Session, Report No. 2489. Appropriations for the Naval Service Feb. 13, 1893.

In 1860 the United States ranked after the following nations and ahead of all the rest:	In 1886 the United States ranked thus:	Rank of the navies of the world when vessels for U. S. Navy now authorized or building are completed:
Great Britain	Great Britain	Great Britain
France	France	France
Russia	Italy	Italy
Spain	Russia	Russia
Sweden and Norway	Germany	Germany
United States	Spain	Spain
	Austria	*United States*
	China	Austria
	Japan	China
	Holland	Japan
	Sweden and Norway	Holland
	Turkey	Sweden and Norway
	Denmark	Turkey
	Greece	Denmark
	Brazil	Greece
	Argentine	Brazil
	Chile	Argentine
	Portugal	Chile
	United States	Portugal
	Peru	Peru
	Mexico	Mexico

So, no doubt, it will be the fortune of our navy to be always

* There is no mistake more commonly, if thoughtlessly, made in considering our new ships than to suppose that we alone are advancing in naval affairs and other nations standing still.

small in numbers, but with no distant colonies to defend, and with our vessels at the alarm of war gathered, so far as may be wise, upon our own threatened coasts; we may obtain the preponderance on either seaboard, if we have but a short cut across the Isthmus.

The strategic value of the canal in the defense of our coasts thus becomes evident at once. By means of it our fleets can be transferred from the Pacific ports to those of the Atlantic with ten thousand miles less steaming than is now the case,* and the smaller navy can be concentrated at a point threatened by foreign attack probably before the blow can be delivered,—an impossibility with ten thousand miles of sea travel along coasts where coal could perhaps not be obtained in war, added to the five thousand miles of steaming between New York and San Francisco, necessary even if a canal were constructed.

In short, a canal under United States control will give all the advantage to the defense that is to be derived from manœuvring on inside lines; and will in addition give the probability of naval stations, and the certainty of coaling stations, on the road of ships from the Pacific to the Atlantic seaboard.

One other advantage is perhaps worthy of mention, though it can only be called forth in the remote contingency of an invasion of the United States either directly, or through a door willingly held open by our neighbors on the north or south. I mean the concentration of the navy to repel a landing upon our coasts.

If invasion were threatened by one of the great powers which, it is thought, can mobilize in a week, and with their fast transports be on our shores long before a ship on the California coast could round South America, or before a strong protecting fleet could, under present conditions, be concentrated on the Pacific, a short cut through Nicaragua might save a national disaster.

Of course, invasion in force of the United States is a most improbable event, still were it to happen at all, it might very well come at a time when the land forces of the nation were fully occupied, and when the attempt could be defeated only by the concentration of the naval defenses.

But besides the great strategic advantage of the canal, there would be many smaller military advantages given to the United

*The actual saving of distance between New York and San Francisco will be about 9894 miles. From New York to San Francisco, via the Nicaragua Canal, the distance is 4960 miles; New Orleans to San Francisco, by canal, 4047 miles.

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States by the waterway, if during times of war it is maintained under the control of the Government. Such, for instance, would be the transport of very heavy ordnance, of torpedoes and bulky material; and of military stores and ammunition from the great manufactories of the east, when the difference of time between sea and land transit would not be important, or when the trans-continental railways are working to their limits. In addition, torpedo boats and other small craft; monitors, perhaps, or improvised ships; and possibly very heavy coast-defense vessels with small coal capacity might pass from ocean to ocean through the canal when it would be impracticable to send them around South America. And lastly, the armed forces of the United States might be transported from the Atlantic or Gulf to the Pacific without the aid of the railroads in certain contingencies too remote to make it worth while to discuss them here. Such will be some of the advantages of the Nicaragua Canal to the defense.

But it often happens that the best defense is the attack, and from this point of view a canal will be of exceeding value to the United States.

Not only will it permit the speedy passage of troop-ships to those countries which have in recent years several times shown their hostility to our flag, but it will bring within our reach the merchant shipping of Europe which reaps such a rich harvest along the coast of South America from Chile to Panama; and will enable us to strike great commercial interests like those of the nitrate beds, as well as to reach the war-ships and land defenses of a western South American state.

With a power to throw a preponderating force on either seaboard, it is evident that the United States may not only defend her own coasts effectively, but may be enabled to so concentrate her naval strength as to threaten any point north or south on the coast of either ocean or in the West Indies, without weakening too greatly her own coast protection, and thus divert a large force of hostile ships by the necessity of defending such stations as Halifax, Esquimalt, Bermuda, Havana, or Jamaica, and of guarding merchant shipping in western waters.

Of course a canal under American control will divert part of our strength for its defense; but considering the position of the waterway, forming, as it will virtually, portion of our own coast line, this amounts simply to adding one more port to those

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already existing on each of the Atlantic and Pacific coasts. Such ports should strengthen rather than weaken the naval defense, since both may be converted by land works into strong harbors of refuge and naval bases, or coaling stations which we greatly need.

But without further considering the details of the defense, it is evident that with nine-tenths of the world's tonnage against her, and with her small naval strength, any interior lines will be of advantage to the United States in defense of her coast. The Nicaragua Canal being such a line, should enable the United States to get to the threatened point first and with the greatest number of guns; or if not quite that, should give the best possible chance to concentrate to meet an attack.

But to secure the great defensive advantage given by her natural position, it is evident that the canal must be something more than a neutral waterway. It must be open at all times either of peace or war to the ships of the United States and closed to those of her enemies. In other words, the Nicaragua Canal in its military aspect must be "A canal under American control."

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The conclusions which would appear logically to flow from the natural conditions that it has been my endeavor to outline, have long ago been reached by this government, and the policy of the United States has been clearly announced in regard to any waterway that may be constructed across the American Isthmus.

In words as simple and perhaps as weighty as those by which Mr. Monroe had, sixty years before, caused the nations of Europe to halt in their interference with the political affairs of this continent, Mr. Hayes in his message to Congress of March 8, 1880, already in part quoted, said:

"The policy of this country is a canal under American control. The United States cannot consent to the surrender of this control to any European power, or to any combination of European powers. If existing treaties between the United States and other nations or if the rights of sovereignty or property of other nations stand in the way of this policy—a contingency which is not apprehended—suitable steps should be taken by just and liberal negotiations to promote and establish the American policy on this subject, consistently with the rights of the nations to be affected by it.

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"The capital invested by corporations or citizens of other countries in such an enterprise must, in a degree, look for protection to one or more of the great powers of the world. No European power can intervene for such protection, without adopting measures on this continent which the United States would deem wholly inadmissible. If the protection of the United States is relied upon, the United States must exercise such control as will enable this country to protect its national interests and maintain the rights of those whose private capital is embarked in the work."

In these words, perhaps, lie the germs of the doctrine as far reaching and as important to the world as was the equally simple announcement of that other doctrine which Mr. Frelinghuysen says, "Has since remained a cardinal principle of our continental policy, (and) in several notable instances, especially in the case of the French attempt to set up imperial authority in Mexico, it guided our political action, and it is to day firmly imbedded in the American heart."

The message of Mr. Hayes, though it seems to have passed away with the occasion that called it forth,* may yet live to become a part of our national faith, and may grow in time into a great national principle that shall govern the policy of the United States in regard to any canal that may be constructed across America.

But as the bare announcement of a principle, unsupported by the statesmen of the day and unexplained in its scope and meaning, may fall far short of an utterance that will fix the policy of the nation—even if the author be a President of the United States; the words of Mr. Hayes could not now be looked upon as determining the attitude of the country toward an isthmian canal had they been left to stand alone. But such is not the case. The doctrine of a canal under American control, foreshadowed by General Grant, affirmed by Mr. Hayes, and reaffirmed by his successors, has been emphasized by statesmen and elaborated by secretaries of the United States, until it should seem that this principle too must have become "firmly imbedded in the American heart."

Chief amongst those who have emphasized this policy stands

* This definition of our policy was announced at a time when European projects at Panama threatened serious complications with the United States over the question of the guarantee of the neutrality of the waterway and Isthmus.

Mr. Blaine, who in letters to our representatives abroad * states the position of the United States in regard to an American canal to be:—

First, That the United States guarantee "positively and efficaciously" the perfect neutrality of the Isthmus and of any inter-oceanic communication that may be constructed upon or over it; and that this guarantee is by the United States alone without the reinforcement or assent of any European power.

Second, That the United States does not wish to interfere with any lawful enterprise in which the citizens or subjects of any foreign power may see fit to embark, nor to claim in time of peace any exclusive privilege for American ships.

Third, That in conjunction with the Republic on whose soil the canal may be located, the same obligations for the use of the canal shall apply to the merchant marine of every nation of the globe, and equally in time of peace to the war-ships of all nations.

Fourth, That in time of war, aside from the defensive use to be made of it by the country in which it is constructed and by the United States, the canal shall be impartially closed against the war vessels of all belligerents, and that during any war in which the United States or her ally may engage, the passage of armed forces of a hostile nation is absolutely inadmissible, and that the United States shall take all needful precautions to prevent the isthmus transit from being used offensively against her interests upon the land or sea.

Fifth, That the canal shall not be used as a strategic point in warfare.

It is true, as has been said, that this definition of policy was called forth by events that have now ceased from troubling, and by conditions that no longer have place in international affairs. Nevertheless, similar conditions will again arise and must be met by this government. When this time comes it is to be hoped that the principles announced will not be forgotten. They can never be disregarded with safety by the United States, for they are as lasting as the very hills that stand between the oceans.

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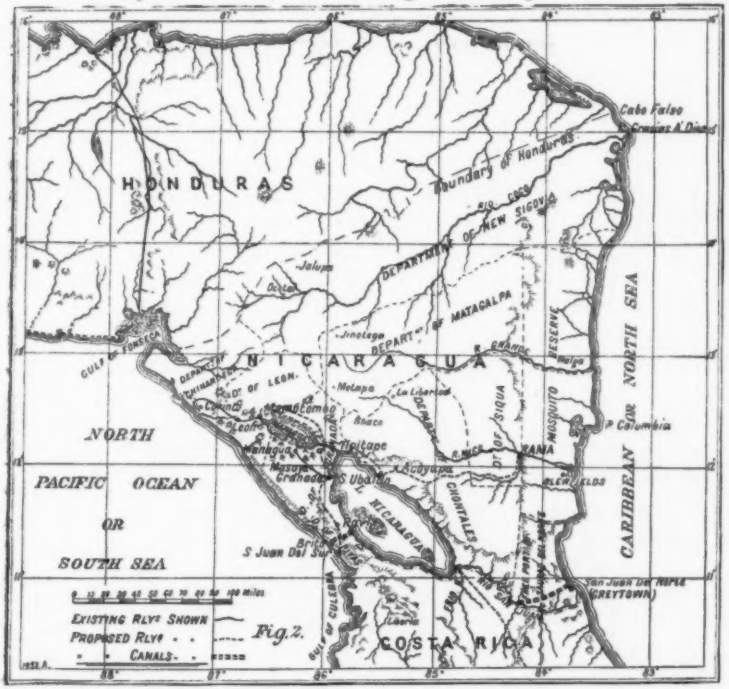
So it would seem that the policy of the United States in re-

* These letters from Mr. Blaine to Mr. Lowell then (1881) Minister to England are too long to be quoted in full here. A mere outline of the main demands of the United States is given.

gard to any waterway across the Isthmus has been indicated by nature and defined by government. *It will be a canal under American control alone.*

This policy implies the intention on the part of the United States to enforce that control. But before proceeding to the consideration of the best manner of doing this, it becomes necessary to outline the conditions surrounding the canal and the characteristics of the waterway itself.

As every one knows, the Nicaragua Canal passes within the



limits of two sovereign states, and is being built under a concession from both.

From Greytown to Ochoa it lies wholly within Nicaragua territory; hence, to the lake, it follows the San Juan River, which is the boundary line between Nicaragua and Costa Rica, to within three miles of Castillo Viejo; from this point westward the canal again lies wholly within Nicaragua.

The Republic of Nicaragua is in area the largest of the Cen-

tral American states; but its population is only about 312,000, of whom at least 30,000 are uncivilized Indians.

Bounded east and west by the ocean, south by the great forests of Costa Rica, and north by the plains and forests of Honduras, Nicaragua is hardly more than a vast wilderness enclosed by wastes of water and land little used by man.

The country is for the most part covered by dense forests; which, however, grow more open on the drier Pacific slopes, and towards the northeast give place to vast savannas almost wholly unoccupied except by Indians and by wild cattle, sprung, it is said, from stock brought long ago from Jamaica and other West India islands.

Along the west coast a ridge of mountains follows closely the sea, while the immediate coast on the east is low and covered usually by jungle and swamp. In this region, and especially in the vicinity of Blewfields, lie the great banana plantations as well as the sections which produce most of the rubber, mahogany, and other valuable woods for which Nicaragua is celebrated. The mountain regions of Chontales are rich in minerals, while west and south of the Lake of Nicaragua, in the districts of Rivas and Granada, lie the more valuable cacao and coffee plantations of the country; her sugar is abundant. Another valuable coffee district is growing up in the department of Matagalpa, north of the lakes; while between these and on the northern and western shores large herds of cattle are raised. Indeed the railroads from Granada to Managua, and especially from Momotombo to Corinto, pass through a fine, well cultivated region producing many cattle, whose hides form one of the chief exports of the country.

The cultivated and more civilized portions of Nicaragua lie for the most part in the comparatively small area enclosed between the Pacific and a line drawn from Corinto, through Chinandegua and Leon, to the Lake of Managua, thence to the capital, Managua, Masaya, Granada to San Jorge, Rivas, and San Juan del Sur.

Here live the more civilized of the people, and here are placed the larger estates which produce the greater portion of the wealth of the country. From the ports of Corinto and San Juan are shipped all, or nearly all, of the coffee, hides and cacao, which, with the rubber and bananas of the east coast, constitute the chief exports of the country.

The chief cities are all placed in the region outlined. They

are, Leon, with about 25,000 inhabitants; Managua, with 18,000; Granada, with 15,000; Chinandegua, 12,500; Masaya, 10,000; Rivas, 8000. These, with Greytown, which has about 2000, and perhaps Blewfields, in the Mosquito Territory, comprise the main settlements.

Nicaragua has but two ports on the Pacific; Corinto and San Juan del Sur; the former a small, hot, dirty, sandy town, lying however, on a fine harbor; the latter a hamlet placed at the foot of a hill overlooking an open roadstead unworthy to be called a harbor. Here lands the northern cable on its way from La Libertad, Salvador, to Panama.

From San Juan telegraph land lines extend to the chief cities, and eastward to Greytown.

On the Atlantic coast Greytown is the only port of consequence. Blewfields, it is true, is a large shipping port for fruits but for little else, and besides it is so isolated as hardly to form a part of the country.

With the exception of the railroad built and owned by the Canal Company, there are but two railroads in Nicaragua, though several others are projected.*

The lines constructed are from Corinto to Momotombo, 58 miles, and from Managua to Granada, 32 miles.

On the Lake of Managua are several good steamers, mostly of English build, but on the Lake of Nicaragua but one steamer worth notice is found; she belongs to the Canal Company which also owns several small river boats, the remains of the old Transportation Company's line.

The waterway between the lakes of Managua and Nicaragua is not navigable, but part of the agreement of the Canal Company is to build a canal between these lakes. Roads are few and bad.

In government, Nicaragua is a republic whose chief magistrate is elected by the people for a term of four years. He is assisted by a cabinet appointed by himself and composed of a Minister of Foreign Affairs and Public Instruction; War, Police and Marine; Government, Justice, and Ecclesiastical Affairs; Finance and Public Credit; and Public Works.

* A line is projected from San Juan del Sur via Rivas to San Jorge on the Lake of Nicaragua; also from Chinandegua to El Viejo, and from Matagalpa to Lake Managua. Concessions have also been given for a line from Lake of Nicaragua to Rama on the Blewfields River, and from Maltagalpa to the east coast, but these are far in the future.

The legislative power is vested in a Congress of two houses, a Senate and House of Representatives, elected by universal suffrage. The Congress meets every two years. The judicial power is vested in a Supreme Court, and other tribunals.

There are said to be 1200 soldiers in the regular army, and five thousand belonging to the militia or reserves,* but these numbers are very uncertain, and depend upon the political condition of the country, and either for defense or offense the Nicaragua army is worthless—except, perhaps, against the unarmed natives.

The soldiers are dirty, undisciplined, ill-clad, and come from the lowest elements of the population amongst whom Indian blood largely prevails. Their equipment is poor, their weapons usually old and rusty, and their ammunition, which deteriorates rapidly in the moist, hot climate, soon becomes worthless, if it is not so when sold to their government.

Cavalry there is none: while of field artillery they have only a few pieces which they cannot use, and for which they have no horses. They have no heavy artillery whatever, except perhaps a piece or two at Corinto, a few old Spanish guns at Granada and San Carlos, and two or three old American cast-iron cannon at Castillo.

The officers are, for their class, worse than the men. They are ignorant and slouchy, and rarely seem to possess a uniform throughout. In short, Nicaragua has no army and has neither the means nor the material for creating one.

It does not need the lessons of the recent revolution to prove that even against an outbreak of her own people the army, such as it is, is inefficient, and the story of Walker and his followers shows how helpless these people—whether soldier or civilian—are against the attack of the northern race. Even against their neighbors of Costa Rica they are weak, and there is not a country of Central America, except possibly Honduras, against which Nicaragua can now hold her own.

The military weakness of the country, and especially of the army, is an important factor in the defense of a canal. Neither Nicaragua nor Costa Rica can be relied upon to furnish police protection.

Nicaragua then as a civilized state is contained in the small area outlined above; but even here civilization exists only in its

* Before the revolution of May, 1893. Vide "Handbook of American Republics."

crudest form. With the exception of Honduras, Nicaragua is the most backward of all the countries lying between the Rio Grande and Panama.

Like most Spanish American States it is a republic only in name; the elections are manipulated by the people in power and the President is absolute until one stronger than he comes to take the reins from his hands. Great parties divided upon questions of national importance do not exist, and politics are simply struggles between rival factions. Granada is the residence of the majority of the great families, and the clique of influential men there has had perhaps the greatest influence in the affairs of the country; to these families are opposed others of Leon and Managua. Hence control in Nicaraguan politics is a question between individuals.

The individual Nicaraguan differs somewhat from the other Central Americans. He is less bold and truculent than the Salvadoranian; less civilized than the Costa Rican and with a greater admixture of Indian blood.

The Nicaraguan appears of a docile type easily led; he is very lazy, dreads all change, and especially fears that northern activity which threatens to invade his country and to put an end to the lazy life which alone is suited to his nature.

This fear exists in many of the Spanish American countries, at least in those lying between the Rio Grande and Panama, and has, it would seem, been one of the causes of indifference, even hostility, displayed towards American projects by people who, while they understand well the material improvement such projects would bring to their country, yet resist them. In spite of what our newspapers may say, in Nicaragua the indifference to the canal has amounted at times to actual hostility; and that on the part of the better class, whose opposition and opinion alone are worth considering. This opposition is by no means due to an ignorance that does not perceive the advantage of a world's waterway through Nicaraguan territory, but to the inertia of the people and largely to the fear that with the introduction of Americans and American ideas will begin an era of progress, competition, and struggle for wealth in which the Nicaraguan is not fitted by nature or habit to engage, and in the course of which he must fall into the condition of an inferior being in his own land.

* * * * * * *

Costa Rica is a far more civilized country than Nicaragua, indeed it is the most advanced of any of the republics from Mexico to Panama. Its people, largely descended from European immigrants, are intelligent, industrious, and for Spanish-Americans, enterprising.

Large amounts of foreign capital are invested in railroads, land and harbor improvements; and in the applications of electricity. The government is perhaps not more stable than those of other Central American governments but changes are less violent and property more secure.

Although the canal touches the borders of Costa Rica, it is at the wilder and least inhabited parts. South of the portion of the San Juan that forms the boundary between this country and Nicaragua, the inhabitants are almost entirely races of Indians, such as the Guatusos (Rabbit Indians), who are amongst the most degraded of the native tribes of America. But these Indians are a harmless people, living chiefly upon fish and bananas, and from them little harm is to be anticipated.

Any outbreak or revolution in Costa Rica would be far from the canal line and separated by wildernesses so vast that no attack would be projected against the canal. It is true that a railroad is in prospect from the settled portions of the country which lie in the east and west belt extending from Puntarenas to Limon; but this road is far in the future and will pass through a wilderness.

No harm to the canal is to be anticipated from Costa Rica, and it is hardly too much to say that no police precautions need be taken against her people; except, of course, in the event of war between Costa Rica and Nicaragua, when the line would have to be well guarded, especially in the west.

* * * * * * *

The Nicaragua Canal, starting from Greytown and skirting Costa Rica, passes through the territory of Nicaragua. From Greytown to the northward extends the unhealthy jungle-covered coast of the Mosquito Territory, Honduras, Guatemala, the English dependency of Belize, Yucatan, and Mexico. In all this long line of coast, indeed as far as the Rio Grande, there are hardly more than half a dozen inhabited places worthy to be called towns. Beyond the mouth of the Rio Grande lie the settlements of our own country, growing rapidly in size and importance. Of these New Orleans, some 1300 miles distant from

Greytown, is the most important commercially in regard to the canal; while Pensacola, and Tampa, the southern terminus of the great northern lines of railroad, are strategically valuable. Our outposts in the Gulf, Key West and Tortugas, stretch southward to within something like 1000 miles of the northern outlet of the canal, and lie almost on the same meridian with it.

South of these, and thrust like a wedge between our Gulf frontier and the canal, lies Cuba, which, in the possession of a country more actively hostile to the United States than Spain, would become a dangerous threat to our interests in Central America.

Eastward again of Cuba lie Hayti and Santo Domingo, neither of importance in connection with our present subject; while eastward again lies the Spanish island of Porto Rico, flanked by the Virgin Group that belongs in part to Denmark, in part to England, and of which the chief islands are Virgin Gorda, Tortola, St. John, St. Croix, and St. Thomas, the most important and the seat of the government of the Danish West Indies.

Southeast of this group extend the Windward Islands, beginning with the English Colonies of Sombrero, Anguilla and neighboring islets, and extending by St. Martin, part of which is French, part Dutch, and the French Island of Saint Bartholomew to the Dutch possession of Suba and St. Eustatius, and the pleasant English colonies of St. Kitts and Nevis, and the islet of Redonda.

Thence extend the English islands of Montserrat and Barbuda, the latter attached to the presidency of Antigua, which is also an English colony.

South of Antigua lie the French colonies of Guadeloupe and Desirade, the neighboring islet of Petite Terre, the islands of Marie Galante and Les Saintes which are under the government of Guadeloupe. Then come Aves Islet and Dominica, which for a hundred years has been a British possession. South of this lies Martinique, settled by the French two hundred and fifty years ago and still a French colony; while south again lie the Windward Islands proper, consisting of the English possessions of St. Lucia, St. Vincent, the Grenadines, Grenada and Barbadoes, which was in the possession of England before the Pilgrims landed at Plymouth. Then follow Tobago and Trinidad, both English. These complete the chain which extends from Cuba and the Bahamas to the Spanish Main.

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Westward along the coast of the continent from Trinidad lie the republics of Venezuela, Colombia, and Costa Rica, the last extending in its turn to the mouth of the river San Juan.

Such are the boundaries of the great inland sea of America from which the Nicaragua Canal leads westward. Like the Mediterranean, it is partly land-locked, and surrounded by regions of great fertility; it is placed on that central belt of commerce that now finds a waterway around the world, except at the barrier of the American Isthmus; it contains magnificent harbors*; it is open to one ocean but by nature closed to the other.

In relation to the two continents of America this Western Mediterranean, as it has been not inaptly called, is so centrally placed that it lies midway between the storm-swept cliffs of Cape Horn and the farthest settlements of the north; it receives the waters of some of the greatest rivers of the earth whose commerce must flow across its surface; while its undeveloped shores, though still covered with jungle, give promise by their climate and soil of becoming a region of wealth far greater than that which surrounds the Mediterranean itself, where the civilization of the world has grown from infancy to manhood—perhaps to old age.

When the canal shall have joined the waters of the Pacific with those of the Atlantic Ocean, the Caribbean will lie almost at the centre of the world's lines of trade and will become the meeting place of ships bound for every sea.

Who can doubt that the barrier, so slight that from the interior heights the eye can reach both oceans,† will be cut, as has that of the Mediterranean, and that the water-girdle of the world will be completed!

Then, when the jungles have been cleared from the shores of the Western sea; when communications have been established and cities built, it may indeed be found that the world's civilization has deserted the older shores, and the centre of human life moved westward to the coast of the New World.

It appears then that the waters of the Gulf of Mexico and of the Caribbean Sea are enclosed by the territories of eight sovereign States; of two dependencies; and by a line of islands and

* Notably those of Cuba.

†From the summit of Irazu in Costa Rica on a clear day both the Caribbean Sea and the Pacific Ocean may be seen.

smaller islets from which float the flags of five of the nations of Europe.

Within these boundaries lie Jamaica, Navassa, the Grand Cayman, and a score of smaller possessions whose importance can only be estimated after the tide of commerce and the progress of civilization shall have given to these regions the importance they must finally possess. Upon the waters of these seas the flags of Great Britain, France, Spain, Holland and Denmark, floating over outposts placed upon our very lines of transit between the Atlantic and Pacific coasts, seem to threaten the destruction of the canal at the first breath of war with the United States.

But the mere presence of European powers in the Caribbean Sea does not mean a threat to the canal or danger to the United States and its lines of communication.

It is true that the Nicaragua Canal has an interest for every country that sends a ship to sea; but it is of primary importance either in peace or war only to a few, and its neutrality and conservation to the interests of the United States can be destroyed by none but great maritime nations whose naval power is at least equal to that of this country.

Those nations are Great Britain, France, Italy, Russia, Germany, and Spain. From the attack of any other nation of the world the seaboards of the United States are measurably safe.*

With Italy or Russia a complication that threatened war with the United States is too remote to be worth considering here; and though it is evident that a mere paper guarantee of neutrality for the canal, and the protection of words alone, might be disregarded by these powers in the heat of war in which the United States remained neutral; yet the violation of a neutrality guarded by the armed forces of this country would be an act that any power of Europe would hesitate to perform. Probably then we may eliminate Italy and Russia from the number of countries with which a difficulty could arise that should threaten the canal.

With Great Britain, France, or even Germany and Spain, the case is somewhat different.

If the lessons of history are accepted, and if the conflict of material interests is studied, it can hardly be doubted that there is an ever-present danger of war between the United States and

* I am not now considering the interior security of the canal, or its destruction by a band of marauders. A child might almost disable it for a time, but the qnestion of police protection is to be considered hereafter.

those countries which possess territory near her borders, or whose producers look to the nations of this continent for their markets, and find their home interests require the limitation of the trade and influence of the United States with other nations of America.

With France and Spain, within the past thirty years, threatening events have occurred which led to the brink of war.

With England a quarrel is ever on hand. Even with Germany at least one threatening dispute has arisen, though the possibility of a serious difficulty with that country is remote, unless indeed Germany, as the ally of some small southern republic, should attempt to curtail our influence in Mexico or the South, or should try to carry her new colonizing policy too near to our shores.

A war between the United States and any single nation other than one of Europe would not even interrupt the even tenor of our way.

Of course we may have to fight a coalition of European and American powers, or a combination of European nations; but the danger is remote, and considering the strength of the navies and of the mercantile marine of the countries of the world, it appears that interference with an American canal under the actual protection of the United States can come only from Great Britain, France, Spain or Germany, or from a war in which one of these countries at least is engaged. In such a case the navies of these countries will constitute our danger, and it may be well to consider somewhat more in detail the possessions which could be used as outposts of attack against the coasts of the United States or against a canal in Nicaragua.

European nations do not hold possessions on our coasts for revenue only. If this were the case many such unprofitable holdings would long since have been abandoned. No doubt the colonies are held in some instances because they have long been possessions of their present owners; and in others because no one will take them off their owners' hands; but they are held chiefly because of their strategic importance, and of their value as naval and coaling stations.

Many of these possessions are fortified, but most of the defensive works are old and useless, and some date back to the days of the buccaneers.

On the shores and islands of the Caribbean Sea and of the Gulf of Mexico there are English land defenses at Georgetown, British Guiana, Bridgetown, Barbadoes, St. Lucia, Kingston, and

Nassau, but none are of great strength, for England seems to have placed her more powerful works nearer to the vitals of the United States.

France has a fortification at Fort de France in Martinique; while Spain has strong defenses at Havana, and a score of more or less dilapidated works at Matanzas, Cienfuegos, Santiago and other places on the coast of Cuba and of Porto Rico.

Denmark has fortified St. Thomas after a fashion; and even the Netherlands have defenses at Curaçoa. Though these works are of little present importance, except perhaps those at Jamaica and Havana, they serve to mark important bases of operation against the American coasts and could readily be converted into strong harbors of refuge and depots of supplies. Many are already by cable in touch with the home government.

On the mainland surrounding the Gulf of Mexico and the Caribbean Sea, there are few fortifications besides our own antiquated works. The most important of all, perhaps, is the historic fort of San Juan de Uloa at Vera Cruz, once a magnificent work, but one that even in its time of strength seems to have fallen before every breath of attack, and has now come to be used as a mere prison. Besides this there still stand a few old relics of pirate days, built on the shores of island or mainland and standing as monuments to Spain, the nation which Macaulay calls "That mighty empire, on which the sun never sets."

But it would seem that first in the West Indies, as she is first in rivalry of the United States wherever the products of civilization and the genius of man are in demand, comes England, our chief rival in interest in the canal.

Blundering as England often seems in the management of questions which affect her empire, changeable and uncertain in her policy towards her own colonies, she has yet steadily pursued towards the United States a course of self-interest, that would seem threatening were it not for the firmly established, and perhaps well-grounded, belief that Great Britain dares not, as well as cares not, come to an open rupture with this country, unless driven into a position from which there is no other escape but by the sacrifice of honor or money. Into such a position it is neither the wish nor the interest of the United States to drive any nation, least of all England, whose interests, though strongly conflicting with our own in some directions, are in others as strongly in accord.

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To say nothing of the inevitable Indian and European complications that would come upon England in the event of war with the United States, money and the interests of property,—which are becoming, if they have not already become, a more powerful argument in questions of peace and war than armed strength itself,—will exert their influence for peace in all questions that may arise between the two great divisions of the English-speaking world. Nevertheless for years past England has seemed to quietly pursue a policy towards the United States that would indicate on her part the expectation of a struggle to come.

It is probable that English statesmen could give other and very good reasons for the circumvallation of our frontier by her fortresses, naval stations, railroads, cables, and interior lines of water communication; for the constant talk and actual work upon her naval stations; for her extension of territory in Belize, and attempted control of the Mosquito coast; and for her steady acquisition of islands of the Pacific ever nearer to our shores.* But the fact remains that English policy has for fifty years been steadily, if slowly, weaving around us a web that in war we shall find difficulty in breaking through.

On the north Halifax has become a great imperial fortress. The Canadian canal at the Sault and the constant agitation of the question of an interior waterway from the St. Lawrence to the Lakes, means nothing less than the desire to secure for English gunboats a road that shall be secure from the dangers of the upper St. Lawrence and the destruction of the Welland Canal—the key to the ocean. Southward in the Atlantic, some 580 miles from the Carolina coast, lies the British island of Bermuda, or rather a group of 365 islets, rising hardly above the ocean but capable of being converted into a gigantic fortress, even now supplied with the necessities of a naval base. Here are maintained large supplies of coal; a great iron floating dock and smaller slip; and machine shops for the repair of ships of large size. Here also is a cable connection with Halifax and the rest of the world, which is to be continued to Nassau and other English islands of the West Indies. Bermuda is a place that would be difficult to capture in the event of war, except in the absence of the British fleet. Even then it could be attacked only from a

* As late as 1891 England took possession of Johnston Island, that land nearest to our coast and west of the Hawaiian group.

distance, for the channel of approach to the chief harbor, Hamilton, is so devious that land batteries and torpedoes could probably prevent the entrance of hostile ships. It is said, and I believe truly, that large reserve supplies of coal and ammunition are kept at Hamilton. The English ships rendezvous here, and garrisons are maintained of considerable though varying strength, at fortifications that are formidable even as they stand and can quickly be made very powerful indeed.

To the unbiased mind, Bermuda looks uncommonly like a base for naval operations directed against the only power worth considering in this quarter, namely, the United States.

South of Bermuda and next in the chain of British outposts surrounding our frontiers, comes Nassau, chief town of the Bahamas and a station for coaling and repair of ships. It is not an important station as it stands, though possessing a small garrison and an ancient fort that might be put in effective condition. Then come Turks and Caicos Islands, of which the Grand Turk is chief, a small collection of sandy islets where even coal is not kept on hand; then follow the stations of Jamaica, where coal and supplies are to be had and considerable garrisons are maintained, chiefly at Kingston and Port Royal, whose fortifications are not formidable in their present state, but can soon be placed in a condition to defend effectively the dangerous channel leading to Kingston harbor, and serve to convert the latter into a safe refuge and naval base.

Passing by Anguilla, where no coal is to be had, the English line of colonies continues to St. Christopher (St. Kitts), where a small coal supply and minor repair shops are placed, as also on the neighboring island of Antigua, and continues on to the ports of Dominica, which are not important.

Then comes Port Castries, St. Lucia, where are placed a government coaling station and facilities for small repairs. (Here it is said an important naval station is to be established.)

At St. Vincent also a small supply of coal is kept, but no repair works, and the same is true for Grenada; while at Barbadoes there are a government coaling station and a newly finished dock. A strong detachment of British troops is kept here. Then comes Trinidad with its coaling station, and at Georgetown Demerara coal is to be had and a dock and repair works exist.

Besides these, on the mainland, coaling and docking facilities are found at Belize; while on the Pacific coast supplies and coal

may be obtained at the Queen Charlotte Islands, at Fort Rupert, Comox, Nanaimo, and at Vancouver, Port Moody, Victoria and Esquimalt. At Vancouver and Victoria are facilities for repairs and at Esquimalt large government dock yards, some day to be defended by heavy batteries.*

South of Puget Sound on the Pacific, England, however, is in no better case than is the United States in regard to supplies and coal. She has no positions within some thousands of miles of the mainland and must like ourselves depend upon the uncertain chance of purchase.

But besides the islands of the Gulf and Caribbean Sea, which have been mentioned, Her Majesty, the Queen, lays claim to other less important territory like the island of the Cayman group, of which the Grand Cayman might, in the event of the completion of the canal, become a place of importance.

It would be absurd to suppose that all these coaling and naval stations are maintained by England as threats against the United States; evidently they are merely the necessities of a great maritime nation. I have enumerated them here simply to show the advantages that England would possess in a struggle for control of the canal. But it is perhaps not too much to say that far-seeing Englishmen, looking forward to the time when an American canal, like that at Suez, shall give another route to Australia and the East, have endeavored in American waters to reproduce the conditions of the Mediterranean, and have sought to carry the line of British possessions westward to the new canal as they have carried the flag of England eastward from Gibraltar, Malta and Cyprus to the shores of the Red Sea and the islands of the Persian Gulf,† almost stealing Egypt on the march and wresting by the power of British gold and the foresight of a Beaconsfield from the very projectors of the first great canal the reward of their endeavor.

It is certain that English successes at Suez, her attempts to gain a footing on the Mosquito coast of Nicaragua, her encroach-

* There has been much discussion regarding the fortification of this important place, and reports have frequently appeared stating that heavy modern guns were about to be placed in position there. Up to the present time, however, nothing has been done at Esquimalt, whose existing defenses are old and useless. It is probable that a second imperial fortress will ere long be placed at this important gate to Canada.

† Of the British possessions in this quarter, the island of Perim, Aden, Somaliland, Socotra, and the Bahrein Islands in the Persian Gulf, Aden at least is being strongly fortified.

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ments at Belize, her power in Mexico, Central America and Chile—which is none the less strong because it is wielded through railroad and commercial companies and private individuals—and her aggressions in Venezuela, need leave no illusion as to English interests in America nor as to the course she would like to pursue regarding any canal that may be built across the Isthmus.

But with the American Canal she will hardly venture to disregard the "Hands Off!" of President Monroe, repeated forcibly by President Hayes, and thundered to the European world by the greatest of recent American Secretaries—Mr. Blaine.

The possessions of France on the American coast, and especially those in the vicinity of the canal, are interesting but by no means dangerous. The few islands of the West Indies left to France after the victories of Rodney have hardly, if at all, been increased in number or importance since the time of the great English Admiral.

Of the Lesser Antilles, France now holds only Guadeloupe and its dependencies, with a total area of about 722 square miles and a population of 165,899. Here near Pointe à Pitre are a French coaling station and small government repair shops. Martinique, with 381 square miles and a population of some 175,000, has a government coaling station at Fort de France and at St. Pierre, with a large dock at the former port and repair shops at both. While at Cayenne there are government coaling depot and repair shops and a population of about 10,500.

The only French islands on the American coast are St. Pierre and Miquelon, close to the shores of Newfoundland. These small islands have a population of some 6000, and the former a floating dock and a government coaling station.

Evidently the French colonies in the West Indies are of no great importance.

From Germany the isolation of the United States is, in a material sense, much more complete even than from France. In spite of the fact that in 1884 the German Empire began to be attacked by the craving for foreign territory which has characterized England for the past century or two, and has cost France so heavily, Germany has still no colonies proper. True she has thrown the protection of the German flag over various sections of the earth's surface, and has sometimes in her eagerness run herself into international difficulties, as in the case of the Caroline Islands and Samoa; but no "protected" German territory lies

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nearer our coast than the Marshall Islands, several thousand miles away.

With Spain the case is different, for, thrust between the territory of the two great republics of America, and separated from the one only by the narrow "silver streak" called the Strait of Florida, and from the other by the almost equally narrow Channel of Yucatan, lies Cuba, "Bulwark of the Antilles and Key of the New World,"* as the old Spanish chronicles called her chief city, Mistress of the Gulf as she may some day prove if hostile to nations bordering the inland sea. Cuba lies due north of Nicaragua, a wedge of European territory thrust between our southern coast and what may eventually become our most valuable outpost; and placed in the very path of trade through a canal.

With her fertile territory hardly producing one-tenth of its possible output; her magnificent harbors—of which many, like Cabañas, and Havana, have hardly their rivals in the world—and with her million and a half of people, Cuba is indeed the key to any canal constructed on the Isthmus.

But this key must be held by stronger and more threatening hands than those of Spain before it can lock this waterway of the world, or frighten American interests in Nicaragua. In spite of flurries such as that caused by the Virginius affair, Cuba in the possession of Spain is perhaps in the position to cause least uneasiness to the United States. No other country likely to possess the island could less threaten our interests, which are best served by her remaining as she is. A stronger owner might threaten the United States, and as a part of our domain she would be most undesirable; for there is no place in a republic for her million and a quarter of creoles, half-castes and negroes, and no room within our borders for her sickly coasts and festering cities. Cuba independent must soon fall under the control of some great power greedy for fresh territory, unless indeed the world is prepared to let another black republic arise in the Caribbean Sea.

The case is measurably the same with Porto Rico, the only other western possession remaining to Spain of the world that was discovered and conquered by her people.

Porto Rico is perhaps the most healthful of all the Antilles; it is well peopled and rich; but in the hands of Spain can hardly be considered important in its relations to the Nicaragua Canal. It seems most improbable that Spain, with her few foreign pos-

* Llave del Nuevo Mundo, Antemural de las Antillas.

sessions, small trade, and natural conservatism, will take any interest or exercise any control in the affairs of an American canal.

Of the remaining European countries possessing colonies and naval stations in the Caribbean Sea little need be said. Probably both Denmark and the Netherlands would prefer to see the neutrality of the canal guaranteed by a power that would always permit access to their ships, rather than by their neighbors in Europe who have been known to become forgetful of the rights of neutrals. But the attitude of these States is not important.

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Such are the surroundings of the eastern approach to the canal of Nicaragua. The western entrance is washed by the waters of the wide Pacific which for thousands of miles touch only the coasts of Spanish-America.

But now let us consider briefly the route of the canal and some of the physical characteristics of the country through which it passes, and of the waterway itself.

ROUTE OF THE NICARAGUA CANAL.*

The line, as finally adopted, is from San Juan del Norte (named Greytown by the English) on the Caribbean Sea, to Brito on the Pacific; its total length is 169.4 miles, of which 26.7 is canal proper, and 142.6 is free navigation by the Lake of Nicaragua, the river San Juan, and the basins formed in the valleys of the Deseado, San Francisco and Tola. The summit level, Lake Nicaragua, is at its mean 110 feet above the mean level of the sea. The sea level is reached on each side by three locks.

From Greytown, the canal passes through a low region covered by forests and jungle to higher lands above the junction of the small rivers Deseado and San Juanillo; thence across a more rolling country still covered with forest and little settled, to the divide which separates the valley of the Deseado from that of the San Francisco; crosses to the latter valley, and continues over a forest covered country where ridges alternate with swamps to the San Juan River at Ochoa.

Ochea lies nearly opposite the junction of the San Juan with its large tributary, the San Carlos, and from this point the canal follows the former stream to the outlet of Lake Nicaragua. In this part of its course the river San Juan flows through an almost

*For details see: Senate Ex. Doc. No. 5, 51st Congress, 2d Session, from which much of the above data is taken. Also report of Major C. E. Dutton, U. S. A.

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uninhabited wilderness. A pile of wood here, a corn patch there, or perhaps two or three wretched huts surrounded by a few clumps of bananas, as at Machuca and the Toro rapids, are the only signs of human life to be seen from Greytown to the lake, excepting the queer little village of Castillo Viejo, where an antiquated fort recalls the days of Spanish rule in America,—a strange sight in the depths of a howling wilderness.

The river as it flows varies little in width from source to mouth; it is here deep, there shallow, but is always the same muddy stream, running on through dense walls of jungle, apparently as solid as the mountain side yet delicate as a mass of feathery lace draped upon a framework of green.

The banks seem generally low, but from the lake to the sea there is hardly a square yard of rock or earth uncovered.

At the outlet of Lake Nicaragua stands the settlement of San Carlos, surrounding another queer little fort perched upon a hill that rises perhaps thirty feet above the level of the lake, the only high land on this eastern shore.

All around San Carlos lies a region of forest and swamp, dreary enough to the eye, except where it stretches away westward across the beautiful lake to the distant mountains of Costa Rica and the Pacific shore; or to the nearer hills that rise from the lake itself and mark the islands of Solentename or the more distant peak of Ometepe.

At the outlet of the lake the Rio Frio joins the San Juan, and is, with the exception of the San Carlos, the only important tributary of the main stream between the lake and Ochoa. Both tributaries flow from the south and have their sources in the mountains of Costa Rica.

From San Carlos to the west, the shore of the Lake of Nicaragua, sometimes high, more often low, extends in almost unbroken wilderness amidst which the few settlements are buried in heavy forests. There are many islands, most of them beautiful in appearance, fertile and often inhabited. The more important, such as the Solentename group, and the large island of Ometepe, in addition to having a healthy climate and fertile soil, are high and wind-swept, yet afford sufficient shelter for shipping against the lake storms—by no means contemptible.

From the Lake of Nicaragua westward, the canal crosses a hilly but well settled region which produces much coffee, cacao, and cane. It is in fact the garden of Nicaragua, where the cli-

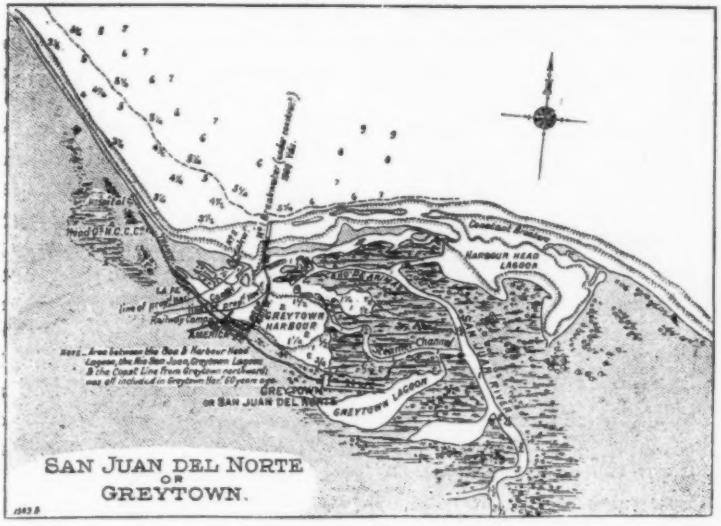
mate is good, if hot, and the comparatively scanty rain-fall prohibits the excessive growth of vegetation that characterizes the eastern slope.

* * * * * *

It is now necessary to consider the line in detail.

The eastern terminus of the canal, Greytown, lies near the mouth of the river San Juan or rather near the northern outlet of that stream, whose main flow is through the southern branch, called the Colorado.

The town lies on a well-sheltered harbor about two miles in-



SAN JUAN DEL NORTE
OR
GREYTOWN.

side the bar, which until the construction of the present jetty was a sand bank rising above the water level.

Greytown now contains about 2000 people, who are a mixed lot of Nicaraguans, West Indian negroes, and hybrids of varying degrees of color. Besides these, there are, or were in the active days of canal construction, large numbers of drifting whites, drawn hither by the opening of the canal and some of whom have not been able to "move on."

Greytown is surrounded by jungle, and lies almost in a marsh above which it hardly rises at any season, and in times of heavy rain is flooded. The rainfall is tremendous, certainly as much as

three hundred inches in a year having been known; but the rainy season does not come with the regularity found elsewhere, though perhaps the smallest rainfall occurs between November and May.

The houses are very generally of wood, mean and decaying in appearance, and possessing the filthy surroundings usual in tropical America. The water is bad; the atmosphere hot and moisture laden; vegetation grows rank on all sides; and it would seem that the comparatively favorable sanitary statistics shown by the doctors can only be due to the hardy class of men who have formed the chief element from which the statistics were probably gathered.

However this may be, Greytown is said to be not an unhealthy place—as places go on the Gulf and the shores of the Caribbean Sea.

Separated from Greytown by the section of the canal already excavated, is a long, low, sandy beach extending seaward and flanking the harbor and bar. On this are placed the store-houses, offices, mess-rooms, officers' quarters, in fact most of the buildings of the canal company; and in front of them all a light tramway runs as far as the hospital at the outer end of the settlement. This is part of Ciudad America over which the Company has been given certain rights by the government of Nicaragua.

The place is wind-swept, clean, and said to be healthy, though enclosed on the land side by marsh and jungle; good water is brought here; the buildings of wood and iron are clean, cool and comfortable. In short this little settlement is a charming oasis in the desert of Nicaraguan heat and dirt.

It may be remarked in passing that a better place for the permanent quarters of a garrison could not perhaps be found on the southern coast of the Caribbean Sea.

In front of Ciudad America lies the harbor bar; and beyond it the jetty which it is thought will by the aid of dredges give a depth of water at the entrance sufficient to admit the largest vessels.

This harbor, once so deep and commodious that the largest ships could lie in safety, is now much filled up; but a basin is to be dredged to a depth of thirty feet. When this is done the harbor of Greytown will be an excellent though small haven; but the entrance will no doubt always be narrow and probably difficult at times for ships to make, for Greytown is placed near the

centre of the trade-wind belt, and as a rule there is considerable sea running on this coast. It would seem, from a military point of view, that well-placed land defenses and torpedoes could most effectively close the eastern terminus of the canal even without the assistance of floating batteries.

From Greytown harbor the canal will run at the sea level for about nine miles through a flat swampy region covered by forests and jungle to Lock No. 1. Along this portion of the line a railway will extend as far as the junction of the canal with the river San Juan.

Near Lock No. 1, the canal will reach the foot-hills which begin to enclose the valley of the river Deseado, a stream that up to this point flows through a low, swampy plain like that of the San Juanillo from its junction with the Deseado to the harbor of Greytown. About ten miles from Greytown the valley of the Deseado becomes more clearly defined; it will be followed by the

canal which, by two additional locks and embankments, will convert the river and valley into three lakes or basins.

The three locks with lifts respectively of thirty-one, thirty, and forty-five feet, will be unprecedented in size. The distance from Lock No. 1 to Lock No. 3 will be about three and one-half miles, and it is evident that a very small effort here could cripple, perhaps destroy the canal, and that this may be considered a *vital* section.

About three miles above Lock No. 3 is to begin what is called the "Great Divide Cut," through which it is intended to carry the waterway from the valley of the Deseado to that of the San Francisco—a somewhat small river flowing into the San Juan from the western watershed of the "Divide Ridge,"

This cut, through what is thought to be solid volcanic rock, is to have a length of 2.9 miles and an average depth of about 140

feet; the water cross section is to be 80 feet wide by 30 feet deep, and on either side is to be a foot-way 5 feet wide.

Evidently this "Divide Cut" may be considered a danger point but less vital, as it could be less easily harmed than the section of locks and embankments below.

To injure the "Divide Cut" materially, high explosives in such large quantities must be used that much difficulty would be found by an enemy in obtaining and placing them in such a region.

From the western end of the "Divide Cut" the canal will be carried a distance of approximately eleven miles, through three basins formed by confining the waters of the Chanchos, San Francisco and the Danta by embankments. These embankments will be numerous and, it is said, at least eight of them will be some sixty feet in height. The material is to be rock fill and earth backing, or as also recommended,* "loose rock." Any of these enbankments could be destroyed even without explosives, and as the destruction of one would mean at least the temporary disablement of the canal, this distance of eleven miles may be looked upon as a second *vital* section.

From the basin of the Danta to the San Juan, a distance of about 2.5 miles, the canal will be in general an easily constructed waterway, thought to pass chiefly through clay, and crossing a succession of ridges and their connecting valleys. To cut the canal here would probably do little damage, and that easily repaired; but from the western end of the "Divide Cut" to the river San Juan there are to be no less than 67 embankments, aggregating in length of crest more than 30,500 feet. The destruction of any one of these would, it is probable, temporarily disable the canal. But the damage might not be serious.

The most important point of the canal, the peg in fact upon which the whole system hangs, will be at Ochoa. Here is to be placed the great dam of the San Juan River, and from Ochoa, slack water navigation will extend up the San Juan to the lake of Niccaragua, across the latter, and on to within 3.5 miles of the Pacific. The dam destroyed, the entire eastern system from the lake of Nicaragua to the Caribbean Sea goes back to natural conditions, and transit for any but very small boats will become impossible.

Upon the successful construction and maintenance of the dam at Ochoa, the whole system rests. It is *the vital* point of the canal.

*Major C. E. Dutton.

The great dam is to be located between two steep hills; its length of weir upon the crest will be 1250 feet, and abutments 650 feet, giving a total length of 1900 feet. The average height above the river bottom will be 61 feet; the thickness at top 25 feet; and at bottom 500 feet, as stated, if the dam be constructed of stone and concrete.

The site chosen is three miles from the junction of the river San Carlos with the river San Juan.

At Ochoa a long narrow lake will be formed by the overflow of the San Carlos; this lake is to be confined on the east by a series of embankments—21 in all—closing short depressions in the ridge which follows the general course of the San Carlos on the east.

The aggregate length of these embankments on the crest will be about 5540 feet; their width on top 15 feet; their material clay. Evidently they could be easily destroyed, with the probable effect of reducing the level of the narrow lake and of rendering the San Juan unnavigable for ships.

By the Ochoa dam a depth of water is obtained sufficient for all vessels for a distance of 64.5 miles of the San Juan River valley to the outlet of Lake Nicaragua. This stretch of river will be converted by the latter into a waterway, having few obstructions and one in which there will be no greater danger of interruption to transit than is the case with ordinary rivers having a narrow channel in parts.

The ship channel, except for twenty-eight miles from the lake to the Toro rapids, will nowhere be less than 1000 feet wide with a minimum depth of 28 feet.

In this section there will be many strong positions where defensive works could effectually close the passage; but it is to be remembered that the region is an impassable wilderness, practically without supplies and wholly without roads. The face of the country is covered with dense jungle, and the river is the only highway. It might be temporarily obstructed like any other river, but the highway cannot be destroyed.

The important strategic positions above Ochoa are Castillo; a stretch of bank perhaps half a mile long between the Diamante and Machuca rapids; the Toro rapids; a few minor positions above; and San Carlos on the eastern shore of the lake.

For about fourteen miles through the soft bottom of the lake a channel will be dredged to deep water.

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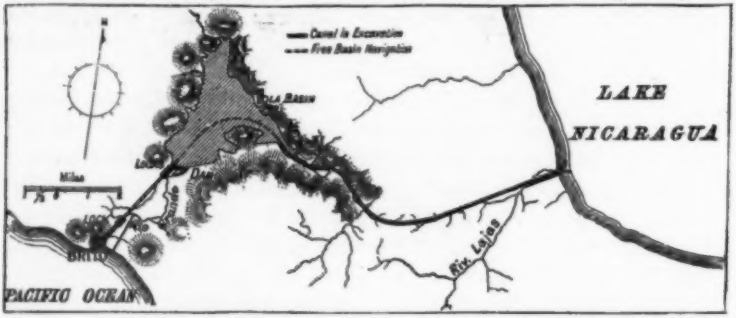
Some twelve miles from San Carlos lie the islands of Solentename, already mentioned; where, or at Ometepe directly off Virgin Bay the western entrance of the canal, advantageous locations for depots of supplies, military and naval stores are found.

From the eastern channel there is free and unobstructed navigation through the lake to within about one half-mile of the western outlet; thence a channel is to be cut and piers constructed to ensure easy entrance to and exit from the canal; but the point is unimportant.

From the lake at the mouth of the river Lajas, the canal is to be carried westward at the lake level and through low ground for about 1.5 miles. Here the ground begins to rise gradually to the Pacific divide. From lake to Pacific the distance is, approximately, 17 miles. Beyond the stretch mentioned, in which there is no point of importance, the canal cut becomes deeper; pro-



ceeding now through rock it crosses, at 4.7 miles from the lake, the lowest point of the continental divide that exists from the snow fields of the North to the wastes of Patagonia. This point is 152 feet above the mean level of the Pacific and 43 feet above the final level of Lake Nicaragua.

One and three-quarters miles beyond this, the canal will reach the narrow valley of the Rio Grande, a stream that frequently "goes dry," and following this for 1.5 miles will cut across a broad plain and enter the basin of the Tola, nine miles from the lake.

This basin will be the terminus of the long summit level of the canal, which will in reality extend from Lock No. 3 to the western end of Tola, where are to lie Locks Nos. 4 and 5, and a second great dam. The place where these are to be constructed is called La Flor.

The Tola basin opens towards the Pacific in a narrow defile through the hills: it is at present dry.

The dam to be constructed at La Flor will be 1800 feet long and 70 feet high; it will act to transform the present valley of the Tola into a lake. Evidently this dam will be very susceptible to harm, since the lower side will be exposed and can be followed dry-shod along the base from abutment to abutment. It will lie about 3.5 miles from the Pacific.

Locks Nos. 4 and 5 are to be placed on a hill north of the dam. La Flor is the vital point of the Pacific section. The dam and locks destroyed, the canal becomes useless until they are replaced; and though repair might not be as difficult in the case of La Flor dam as it would be with that at Ochoa, the seeming ease with which the former could be destroyed and the important and complicated works placed there make La Flor a place to be carefully guarded.

From Locks Nos. 4 and 5 a stretch of canal extends 1.25 miles to Lock No. 6, the most westerly of all. This may be considered as a vital point, the last existing.

From Lock No. 6 the canal will extend about .5 mile to Brito. This stretch will really be a part of the harbor at that place.

No harbor now exists at Brito, but the design is to construct a shelter there by means of breakwaters. On the west of the canal entrance a rocky promontory stretches out into the sea and from this a breakwater is to extend 900 feet towards a second jetty built out normal to the beach. The proposed harbor will then be partly in the deep water enclosed by the jetties; but the main part will be formed by excavating a portion of the alluvial valley lying at the outlet of the canal. The whole will form a deep, broad basin running 3000 feet within the present shore line at high water, and 3900 feet feet from the entrance between the jetties.

An extension of this harbor will be formed by the canal itself, excavated to the sea level and having larger dimensions than ordinary for 3000 feet further inland. Here a tide-lock is to be placed.

It is thought that this makeshift harbor will answer its purpose. The Pacific here is a quiet ocean; heavy winds usually blow off shore, and storms are of rare occurrence.

It is evident that batteries on the hills near the canal, and torpedoes placed within the dredgings, would close the western

entrance; but considering the destructible character of the shelters and the probability that Locks Nos. 4, 5 and 6, the tide-lock and even La Flor dam, may be reached by fire from the sea, floating defenses are far more necessary here than at the Atlantic outlet. Bombardment by war-ships off Greytown could hardly damage the canal materially, since the first vital point lies some ten miles from the harbor, and will no doubt be hidden from the sea as well as be at the extreme range of the heaviest artillery of ships off the coast. The harm possible from bombardment to Greytown itself, such as injury to shops and material, would be slight even if floating batteries could not be spared to assist land works and torpedo defenses placed there.

But at Brito the case is different. The vitals of the Pacific section all lie within easy range of ships, for they are but three and one-half miles from the coast. The water is deep well in shore, and as the canal will run almost in a straight line from coast to locks it forms a broad highway through which ships' guns could probably reach the important works of the Pacific section. It would seem that in spite of the heaviest land defenses likely to be built, war-ships would be necessary here in the event of hostilities that should threaten the safety of the canal.

From this sketch of the canal system it appears that there are five localities where are to be placed those constructions upon which the life of the whole depends. They are not equally vulnerable, nor would the destruction of some be as fatal as that of others, since the rapidity and ease of repair differ; nevertheless, they must all be constantly and carefully guarded.

In the order of their importance, the vital sections of the canal would seem to be:

1st. The Ochoa dam and the embankments of the San Carlos.

2d. La Flor dam and Locks Nos. 4 and 5.

3d. Locks Nos. 1, 2, and 3, with their accompanying dams and embankments, forming the basin of the Deseado.

4th. Lock No. 6.

5th. The embankments forming the basins of the Chanchos, San Francisco, and Danta.

There are, of course, many minor points where great harm might be inflicted, perhaps even a temporary paralysis of the canal system produced.

Injury at either of the "Divide Cuts," at the eastern lower levels, at the western levels from the lake to the Tola basion or

even obstructions placed in the river San Juan, might produce serious results; but to effect any considerable damage to the canal at other than vital points, time and large means of producing injury must be at hand.

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Such is the proposed canal, and such the strategic and political conditions waiting upon its construction. If the latter have been clearly and correctly stated, it would seem that the United States will insist upon treating the Nicaragua Canal as part of her coast line, and will look upon it as she would upon any other line of transit that she might control—open during peace to the whole world, to armed forces by courtesy, as well as to peaceful trade; in time of war closed to the war-ships of belligerents, unless the United States or the country in which the canal is constructed is engaged; not a strategic point in warfare; and, in the event of war to which the United States is a party, absolutely American and as much under her protection as the capital itself.

Such is the meaning of the policy announced to the world by the United States. It would seem that its enforcement cannot be left to a "paper guarantee" that might fly away at the first shot of a cannon in a European war.

* * * * * * *

No doubt the safety of so great a work against actual destruction would, under ordinary conditions of war, seem to be sufficiently assured by that moral law which, in recent times, appears to prevent civilized nations from destroying the great works of peace which are useful to mankind. We have seen a "paper guarantee" of neutrality effective for half a century at Panama; and a mere "assurance that the sphere of operations should not be extended to the canal," sufficient at Suez to prevent interference with the world's traffic there, even when this canal lay within the territory of one of the belligerents. But the Panama railway does not invite attack or seizure from without, as a waterway would; and behind the mild assurance of exemption for the Suez Canal stood the guns of the British fleet and the land defenses on the route to India.

Beside these considerations lies the fact that the enemies of a Nicaragua Canal may not always be highly civilized and controlled by the moral sense mentioned, or by any moral sense whatever. This could hardly fail to be the case if a Spanish-American State were at war with Nicaragua; then no moral de-

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fense nor paper guarantee could protect the canal from harm. We have had sufficient experience with these countries of late years to know that they are not scrupulous in warfare and so far as the United States is concerned; that they have little dread, indeed little respect, for the distant power of this country. They do not realize it and can only be prevented by force from defying it. Actual defenses then must be provided, by the United States, both for external and internal protection, and it remains for the writer to suggest what he believes these defenses will be.

The dangers to which the canal, built and in operation, is exposed, are of two kinds.

1st. Those that may arise in the country through which the canal passes.

2d. Those which may come from without.

From a foreign enemy it need be protected only at its outlets, since from the character of the country it can only be attacked through Greytown on the east; and on the west the danger space extends only for a distance of about 3.5 miles from Brito.

Against an enemy within, the canal must be guarded at every vital point and carefully watched throughout. This police protection cannot be given by either Nicaragua or Costa Rica. So it appears that against both classes of danger the canal must be protected by the United States alone.

It has been said that "The military power of the United States as shown by the recent Civil War, is without limit, and in any conflict on the American continent is irresistible." *

Considering this fact in connection with the strategic conditions outlined; the strength of foreign navies; the European military and naval stations near United States coasts; the position of European outposts in the Caribbean Sea; the probable numerical weakness of our own navy; its necessarily wide dispersion in the defense of our coast; the many uses to which it may be put in the attack; our utter lack of naval stations nearer than Florida, or perhaps Key West and Tortugas; it would seem to be mere folly to trust the defense of the canal to the navy alone.

The requirements of a navy and the conditions existing in the Caribbean Sea, of themselves, prevent this; and compelling the establishment of naval bases nearer the canal than our enemies' outpost, naturally suggest that the United States place a well-

* Mr. Blaine.

fortified station and harbor of refuge at Greytown, and for the Pacific fleets a similar station at Brito.

Other stations in the vicinity of these may be acquired, but none will be as valuable, since suitable land defenses here, besides affording protection to ships, coal, and supplies, close the canal to an enemy from without; protect it from seizure; besides keeping it open for the uses of the United States under any probable conditions (except, of course, blockade by an enemy with a heavy preponderance of ships). In short to hold the termini is to hold the canal from interference from without; for, considering the character of the country and its communications, a flank attack in force from the east would be impossible, and from the west impracticable in face of war-ships at Brito and a heavy garrison at that place.

Such attack could come only from San Juan del Sur, or possibly from Corinto by advance through Nicaragua; and any probable force that could reach the canal would be small, deficient in artillery, and would be swept away by our cruisers in the canal and by the troops at Brito and La Flor.

Greytown and Brito fortified and garrisoned, besides protecting the canal from foreign attack, will form the bases for land forces and gunboats patrolling the canal or operating for its protection against marauders and irresponsible rebels from the interior of Nicaragua or Costa Rica.

This is very evident from the fact that the length of line to be guarded by troops will be, on the east, only from Greytown to Ochoa, a distance of 32.5 miles, traversed by railroad; and on the west the 3.5 miles from Brito to La Flor. The remainder of the line may be safely left to cruisers.

It is thought that when the canal shall have been completed, it will be found necessary to place at the eastern outlet, preferably along the coast of Ciudad America and on the opposite side of the harbor entrance, sand and cement emplacements for heavy guns; rapid-fire guns; and all the essentials for torpedo defense, and defense against boat attack. On this comparatively healthy strip of coast will be built, in accordance with the requirements of the climate, barracks, hospitals, repair shops, and everything needful for a large, self-sustaining garrison; this, with care, need not suffer in health, and in time of peace need not be large, but at the threat of war will be so heavily reinforced as to prevent all danger from attack here by ships or landing parties; or from possible boat

attack at Ochoa by the way of the Colorado (should water enough remain in that stream for light draught boats).

From Greytown as a base, an outpost (small in peace) will be thrown out to the Ochoa dam, which will be within easy reach, 32.5 miles by rail. The railroad will be provided with a few armored cars fitted for the use of field and rapid-fire guns, for the patrol of the eastern section of the canal as far as Ochoa, and to aid the watchmen at the dams and basins between Greytown and the dam, if summoned by telegraph or telephone.

Possibly a small earthwork or two armed with machine guns will be placed at Ochoa; but as the only enemy to be anticipated would be armed with muskets or possibly with a few light guns, no heavy works or large garrisons would be necessary here for interior defense and no attack is, from the character of the country, to be anticipated from without. The detachment at Ochoa will be frequently changed on account of the danger of the climate, though this is probably not great.

No other defenses will be needed on the Atlantic side of the canal and no garrisons need be placed along the line of slack water navigation or in the lake. Little exists in these sections necessary to guard, except such works as light-houses and piers or depots; which may be left to the protection of (say) two small cruisers suitable for lake and river navigation, armed with light guns. These cruisers will patrol the canal and guard against danger from the Rio Frio or from the San Carlos. They may well have a base of supplies on one of the islands of the Solentename group or on Ometepe. In either case the depot will be reasonably secure from interference, if provided with a small garrison.

The Pacific section will be guarded by landed defenses at Brito, as heavy as may be, and provided with all the accessories of defense; hills here form an advantageous site. Torpedoes will of course be in readiness, and barracks built, as at Greytown, sufficient for the use of a much larger force than will ordinarily be kept on duty.

No matter how strong the land defenses may be at Brito, however, ships will be sent to aid the defense there at the outbreak of any war threatening the destruction of the canal. At this port torpedo boats and automobile torpedoes will be of great service.

From Brito an outpost will be thrown out to La Flor and small earthworks built there as at Ochoa, and a sufficient force will be maintained in time of war to prevent any danger of a

flank attack from Corinto or San Juan del Sur. This is a healthy region, though hot, and the health of a garrison need not suffer.

It is believed that no other defensive works will be needed to protect the canal. Probably, however, it would be found well to establish a sanitary camp on one of the islands of the lake whose climate is good, or to place such a camp in the high region of Matagalpa; or better still at the sanitary springs near Cartago in Costa Rica.

In the event of war, especially with England, it would seem vital to the interests of the United States to hold the Nicaragua Canal; not only to aid the home defense, but because, should the canal fall into the enemy's hands, our coasts would be doubly in danger from cruisers; and our land frontiers seriously threatened by the ease of movement of troops from Australia and the Pacific colonies, possibly from India. In such a war the United States must hold the canal to the end; or, as a last resort, must disable it for a time, rather than to allow it to fall to the uses of the enemy. But the necessity for disabling the canal would be merely a remote possibility if proper and timely means are taken by the United States to secure its safety.

Such is the writer's view of the military aspects of the Nicaragua Canal. It may be thought that he takes too much for granted in assuming United States control of the present canal, in view of the terms of the concession granted to the company by Nicaragua; of the treaty obligations of that country, and of the United States; and of the claims to ownership which may be shared by all nationalities. Indeed it seems to be the common belief that the canal now in process of construction is a mere private undertaking with which the Government of the United States has no concern beyond the fact of charter and the protection of citizens engaged in an enterprise in a foreign and distant region. Yet such is not held to be the fact, and the interest of the United States in the Nicaragua Canal has been recently and strongly affirmed in the Senate.* But long before this present enterprise had taken form, it was announced by one of our great statesmen that "The United States (therefore) as the great commercial and political power of America, became necessarily, a principal party to any project which shall exhibit such solidity and proportions as to distinguish it from the unsubstantial and

* See Senate Doc. 52d Congress, 2d Session, Report No. 1142, Dec. 22, 1892.

illusory schemes which have, from time to time, proposed to solve the problem of interoceanic transit.*

Whether events shall prove the present enterprise to be a success or a failure, the project has certainly passed beyond the stage of an "unsubstantial and illusory scheme," and the United States has become a principal party to it.

Already she has shown indications of an intention to assume control of the canal.† But before this policy can be carried into effect not only must the United States rid herself beyond question of the embarrassing Clayton-Bulwer treaty, but she must obtain the release of Nicaragua from probable treaty obligations with other nations; and must obtain from Nicaragua and Costa Rica privileges not now granted; and in assuming protection the United States government must in justice recognize the rights of the company which has undertaken, alone and without support, to solve the problem of interoceanic communication.

But it can hardly be doubted that long before the Nicaragua Canal can be completed, the United States will have found some way by which national control of the political and military relations will have been effected to the injury of none, with honor to the State, and in accordance with treaty obligations and private rights.

The question of ownership will be no more a factor in the military control of the canal than it has proved at Panama and Suez; and no doubt the United States will avoid all commercial interference.

But no matter who may be the owners, who the concessionaires, or what the terms of the concession, the interest of the United States in the Nicaragua Canal is supreme. Whether she will see fit to assert this claim as a government, before the canal is completed, and give her powerful aid to success; or whether she will refuse all interference until the work has been accomplished, is not for the writer to consider. Whatever the action

* W. M. Evarts, when Secretary of State.

† February 14, 1893, Mr. Quay submitted to the Senate an amendment which read as follows: "This Act shall not take effect until the Government of the United States shall have secured by convention with the Governments of Costa Rica and Nicaragua, the right to fortify and garrison the termini of the proposed canal upon the Atlantic and Pacific oceans, and to maintain one or more armed vessels upon the Lake of Nicaragua, and to move military forces through the territory of either of those States for the purpose of protecting the canal and the persons of citizens of the United States operating the same."

may be, there seems to be little doubt of the fact that the people of the United States are the parties chiefly interested in the Nicaragua Canal, and the Government must alone and effectively guard this highway across her continent—this part of her own coast line.

That the United States will be supreme in America is the belief of the writer.

REMARKS UPON THE ORGANIZATION OF THE ARMIES OF EUROPE.

By Captain J. J. O'CONNELL, 1st U. S. Infantry.

(*Continued from* Journal, *No. 66.*)

THE FRENCH ARMY (*Continued*).

IN order to make France united and powerful, its manhood has been organized into an army. Every able-bodied man is a soldier, and has to drill and serve three years actively with the colors. Only those who are studying for the Church and learned professions and are able to pass a high standard in examination and those who under given limitations purchase their discharge, are let off with one year of active service.

Now, this system is unquestionably of great advantage, not to the nation only, but to the individual soldier. All the young men receive an education and setting-up, which transforms louts and boobies into trim and intelligent men ; for the French military course is not one of drill of the body merely, but one of mental development. By this system all the young men of the country are taught obedience to authority, promptness in action, and are brought into discipline, subordination, and to a sense of personal responsibility and independence,—the best possible training a young man can receive. There are very few exceptions to this general conscription, not enough to make a very material difference. The term of service is twenty-five years and the age between 20 and 45.

MOBILIZATION.

The law of 1873 regulates the general organization of the army and divides it into eighteen corps. France is divided into eighteen territorial departments, in each of which is located an army corps. The nineteenth corps is formed of Algerian troops and recruited in that colony. Each Department is divided into eight subdivisions, corresponding with the eight regiments in a corps—a subdivision to a regiment—according to the following conditions :—Every man belonging to the reserves, or excused from service in times of peace (none are exempt from service in

war times) is placed at the moment of mobilization in the regiment located in the subdivision in which he lives. Those intended for the arms of the service other than infantry, are recruited from the reserves in all the subdivisions of the department.

The organization of the Territorial Army is based on the department system. Each division of the department has its territorial regiment of infantry which is recruited exclusively within the division, which thus becomes a reserve division for the active army and a recruiting one for the territorial army. The artillery, cavalry, engineers and train, of the territorial army are recruited from the entire territorial department. The men composing the reserves and territorial army are only called out for duty for a certain period each year, which is twenty-eight days for the former and thirteen for the latter.

At the headquarters of every department and division are kept the names of every male member of the community who is eligible for military service, and there are strict regulations, in case of change of residence, to meet every emergency. At certain specified times the men amenable for service are ordered to report to the military authority in their district for examination and enlistment, and those who pass the medical scrutiny are divided according to fitness among the different branches of the line. There are severe penalties imposed for the non-fulfilment of these duties.

The annual contingent for 1893 amounts to exactly 179,142 men, of whom 127,438 serve for three or two years (in cavalry and artillery, three; in infantry, two years), and 51,704 for one year. By the law of 1873 the term of service was twenty years, divided as follows: 5 years in the standing army, 4 in the reserve of the standing army, 5 in the territorial army, and 6 in the reserve of the territorial army.

Since 1873 the annual contingent has varied between 162,000 and 179,000, and taking the average annual contingent to be 170,000, there must be, roughly calculating and allowing a liberal margin for casualties, the following number of trained men in France:—1,600,000 men with nominally 5 years' training, 640,000 men with one year's training, 900,000 men summarily instructed and able-bodied; total, 3,140,000.

Under the law of 1889 making the term of service twenty-five years, reducing the service with the colors to three years, and increasing it in the reserves to ten,—the effect of which is doubtful

upon the efficiency of the fighting force, since some of the best judges consider the change can only be successful with a good corps of non-commissioned officers,—the strength of the army is at once increased by retaining the contingents five years longer. This increase would be about 250,000 men with 5 years' training, 100,000 men with 1 year's training, 150,000 men summarily instructed, or a total of 500,000 which, added to 3,140,000, gives 3,640,000 trained soldiers to France at the present writing.

By the new law, the conscript, having served 13 years in the standing army and its reserve, passes into the territorial army for 6 years, after which he is transferred to its reserves for a like term. This law includes men of 45 for military service.

The French reserve troops are formed as follows: There are 163 regiments of infantry of the line each composed of 4 battalions. One battalion in each regiment is skeletonized and there are, therefore, 163 skeleton battalions, each of which forms the nucleus of a regiment, which is composed of the skeleton battalion filled with reserves, and three battalions of the territorial army. These are called mixed regiments and were tried in the Fall manœuvres of 1892, and not found to be as satisfactory as expected, especially in regard to the efficiency of their officers. This force can be fully organized into as many corps as the standing army, which consists of about 500,000 men. Thus, in case of war, France can mobilize 20 corps as the 1st Line and have 20 corps in readiness to support it for the 2d Line.

The military year is divided into two parts, winter and spring for theoretical and practical instructions in barracks,—summer and autumn for grand and minor manœuvres in the field. In winter, besides theoretical instruction, the daily drill is inexorable, and, weather or no weather, it must be unflinchingly gone through with. In summer the studies of the winter months are illustrated practically by the whole army, either in grand manœuvres as in 1891 and 1892 (when 150,000 and 200,000 men were mobilized and divided into two opposing forces), or in minor manœuvres whereby every division, brigade and regiment, in every territorial department, subdivision and barrack, is exercised either individually or unitedly. Thus the three lines constituting the army of France are yearly exercised in their military duties. At the beginning the drill is poor, but at the end of a week great improvement is noted, and the men readily perform the movements in which they have been drilled. An intense

military spirit pervades these summer encampments, and a deep enthusiasm for whatever pertains to the profession of arms seems to actuate both officers and men.

This year (1893) the grand manœuvres, under the command of General Billot, will employ the 2d and 3d regular Army Corps, commanded respectively by Generals Hervé and de Gueny, as opposing forces, to each of which will be attached a division of mixed regiments, in all numbering about 120,000 men of all arms. They will manœuvre in the neighborhood of Amiens, Rouen and Compiègne. Besides these manœuvres, every division and brigade of the standing army and the troops in the military governments of Paris and Lyons, will be separately manœuvred. In the regional divisions of the 1st, 4th, 5th, 9th, 10th, 11th, 12th, 16th and 17th Army Corps, the manœuvres of the territorial army in division and brigade will also take place. In like manner the 1st, 3d and 4th Cavalry Divisions and the 6th Dragoon Brigade will be exercised. The general staff excursions for field work will take place in the 1st, 2d, 5th, 6th, 9th, 11th, 12th, 13th and 17th Army Corps.

The territorial army and resèrve at the end of the summer exercises may be compared in efficiency with the best type of our National Guards, viz., those of Pennsylvania and New York.

ORGANIZATION.

The salient points of mobilization having been partially described, the broader question of the organization of the army as a whole will now be considered.

The principle in practice is that of localization, that is, the preservation of a definite connection between a certain province or district or division and a corresponding unit of the army. In our service this principle has not been applied, except lately and that to a very limited extent, viz., the recruiting of regiments in the locality in which they are serving.

In France, every unit, up to and including the army corps, has a corresponding locality with which it is indissolubly connected. Under no circumstances is one army corps made dependent on another, or on a central establishment outside its own division, for the supply of any stores or necessary supplies. Each corps is practically as independent as if it were the National Guard of one of our Sovereign States, so that in case of emergency the preparation of all for the field is simultaneous and without

clashing. This principle of localization and resultant decentralization is so thorough, that on the receipt of orders by the corps commanders they can at once proceed with the execution of them without any further reference to the headquarters at Paris or elsewhere. The same principle of individual and local responsibility in the smaller units also prevails.

The 44 States of the American Republic are practically 44 miltary divisions, each containing the nucleus of an army corps or more, the whole constituting the Grand Army of the United States. A commendable departure from the conservatism of the last 25 years, and one urgently demanded by the extent, wealth and population (and self-protection against possible civil strife) of the country, would be the increase of our regular establishment to the numerical strength of an European army corps—about 40,000 men. This increase is also demanded by the fact that in a few years the armies of individual States will surpass in numbers the army of the United States.

The strength of the active army of France on a peace footing is—28,382 officers, 484,015 men, and 140,879 horses; divided into 18 corps consisting of 727 infantry battalions, 448 squadrons, 456 batteries, 22 engineer battalions, and 20 train squadrons.

Besides this fighting strength the army includes:—The personnel of the general officers and of the general service departments, viz.: of the general staff and of the corps of control and administration of the army and that of particular branches of the service; the special staffs of the artillery and engineers; the corps of military intendance; the corps of medical officers; the officers of administration; the secretaries of the staff and recruiting departments; the department of military laborers of the administration; the department of military hospitals; the chaplains; the recruiting and mobilization departments; the telegraph service; the railway service; military schools; depots of remount; the Algerian contingent; the armed police force; and the sapper and miner regiment of the city of Paris.

The number and composition of the cadets on a peace and war footing, and the normal effective in privates which they should contain, both on a war and peace footing, is fixed by existing laws.

The Infantry.—There are 163 regiments of the line, each consisting of three battalion of four companies and a skeleton battalion; 30 battalions of *chasseurs à pied* of six companies, plus one

skeleton battalion. The 19th Corps contains the following special troops:—4 regiments of Zouaves of 4 battalions of 4 companies, plus 2 companies at depot; 4 regiments of Algerian sharpshooters of 4 battalions of 4 companies, plus 1 in depot; 2 regiments of foreigners of 4 battalions of 4 companies plus 1 in depot (the number of the battalions and companies in each of the Foreign Legion may be modified by the President of the Republic, according to the condition of the recruiting fund); and 5 battalions of African light infantry of 6 companies each (the number of companies in these battalions is determined by the Minister of War, according to the needs of the service).

The Cavalry.—The cavalry consists of ninety-one regiments: 14 regiments of cuirassiers (heavy cavalry), 31 regiments of dragoons (heavy cavalry), 35 regiments of light cavalry (of which 21 are chasseurs and 14 hussars) 6 regiments of African chasseurs, 4 regiments of Spahis, and 1 troop of Soudan Spahis. The first 86 regiments consist of 5 troops each, and are divided into 18 brigades of 2 regiments (one brigade to each army corps) and into a number of divisions and brigades independent of the 18 corps. The Spahi regiments are of 6 troops and belong exclusively to the 19th Corps.

There are also 19 troops of volunteer scouts and 8 troops of cavalry of remount, the former of which are called into service at the moment of mobilization and autumn manœuvres, and are attached to one of the corps cavalry regiments. The latter are distributed as follows:—One troop at each of the four cavalry remount depots, one at the schools, and three in Algeria. The composition of the units of these different bodies of troops on both peace and war footing, and the number of privates in each, are fixed by law.

The Artillery.—The artillery consists of 16 battalions of foot artillery of 6 batteries each; 38 regiments of light and horse artillery, forming 19 brigades of 2 regiments, assigned at the rate of one to each army corps (the first or divisional regiment of each brigade has 12 batteries, and forms the divisional artillery; the second or corps regiment, containing nine light and three horse-batteries, furnishes the corps artillery); 12 mountain batteries intended for service in the Alps; 16 batteries for service in Corsica and Africa; 2 regiments of artillery pontooners of 14 companies each; 10 companies of artillery workmen and 3 com-

panies of artificers. All the material for the artillery, engineers and train is made by the artillery workmen.

The number of guns, therefore, ready to take the field is—2760 field guns of calibres 90, 80 and 74 mm., and 120 mountain guns of 80 mm.*

The Engineers.—There are four regiments of sappers and miners, with headquarters at the four engineer schools, viz.: Versailles, Montpellier, Arras and Grenoble. Three of these regiments have 5 battalions of 5 companies each and one company of sapper conductors; 1 regiment consists of only 4 battalions of 4 companies each and one company of conductors. There is also one regiment of railroad sappers of 3 battalions of 4 companies each, and one

*The following modifications in the preceding organizations passed the Chamber of Deputies on the 27th of June, 1893, and were adopted by the Senate on the 17th of July:

Infantry of the Line.—The supplemental cadres shall consist of one lieutenant-colonel, one major, 8 captains and 4 lieutenants in 72 regiments; and in 73, 2 majors, 8 captains and 4 lieutenants. The lieutenant-colonel in the 72 regiments is an effort at increasing the promotion of officers.

Cavalry.—Cavalry regiments shall uniformly consist of 5 troops. The captain *en second* of the 5th troop shall exercise the functions of clothing officer as far as such are distinct from those of the captain paymaster.

Artillery.—Fortress artillery shall consist of 18 battalions, with authority for adding two, depending on the resources of the recruiting service and a special appropriation. The artillery is increased as follows:—Fortress artillery, one captian *en second* per battalion; field artillery, one major and three captains *en second* per regiment; Alpine batteries, one captain *en second* each.

The object of the law making the above changes is to perfect and solidify the regiments of reserves, the "mixed regiments" having been deemed a failure and the plan therefore abandoned. This increase of officers in the supplemental cadres to the regiments of the line, is made with the intention of having the regiments of reserve fully officered at the moment of mobilization, and thus the reserves, instead of mustering 20 corps for the second line, will be a second army of the first line, the supplemental field officers, captains and captains *en second*, with the regiments of the Active Army, officering the reserves as they are immediately formed and called into service.

This law also provides that second lieutenants, pupils of the schools of application, having finished their two years' course, cease to belong to the staff of their particular arm of the service and are classified in their regiments, the artillery pupils with the field artillery. Officers who are detailed for two years on the staff, and those who have finished a two years' course at the Superior School of War, are detached from their respective regiments.

All officers, including the rank of colonel, who have served twenty years may be retired from active service on their own application, and receive retired pay proportionally to the number of years of service, providing the number does not exceed 200 per year and 2000 altogether. The number is divided equally between the different arms of the service, according to the number of officers in each. In case of war these officers are not exempt from service if physically competent to perform it.

XUM

company of conductors. A battalion of sappers and miners is assigned to each corps for mobilization, and there can be no change in the personnel of these units without the order of the Minister of War. The making of powder and other explosives is confided to a special corps of engineers, recruited from the Polytechnic and placed under the direct control of the Minister of War.

Military Train.—The military train consists of 20 battalions stationed in France, of 3 companies each. They are attached to army corps, one to each, and bear the number of the corps. The 20th is stationed in Paris and vicinity. The duties performed by this branch of the service are of the greatest importance. It has to provide regular transport for the supply columns, ambulances, postal and telegraph departments, and staff. The special vehicles for this purpose are kept ready in the stores of the artillery school of each army corps. On mobilization, the number of companies in each battalion is doubled and the strain on the organization is immense.

The general officers, consisting of generals of brigade, division, and corps commanders, are divided into two classes:—1st. Those in active service and disposable for active service. 2d. Generals of division and brigade who are in the reserve cadres. General officers may be placed in the second class by order of the President of the Republic, or on their own application on account of physical infirmity which unfits them for active service. They may be restored to the first class on proper representation that the infirmity has ceased. The time passed by them in the reserves counts only in calculating their retirement.

There are 640 officers in the general staff, divided as follows: 30 colonels, 40 lieutenant-colonels, 170 majors, and 400 captains.

Administrative Departments.—These comprise the intendance, medical, legal, veterinary, postal and chaplain cadres, each controlled by a chief, whose position is analogous to that of an officer of the general staff with reference to military services, except that the chief of the intendance corps is in some respects directly responsible to the War Minister, and is so far independent of the general commanding.

The officers of the commissariat consist of two classes,—the administrative officers who are attached to the staff of divisions or army corps, and the executive who belong to the commissariat and wagon-pack columns. The organization and execution of the various administrative services; the supervision and

continual control of the interior economy of corps and detachments; form a portion of the duty of the intendance or supply corps, as well as the authorization of all expenses, the verification and audit of accounts of issues of all kinds, in short, all the details of administration. The chief commissary of an army has under his direction the agents who supply forage, hospital requisites, clothing, camp equipment and the articles necessary for troops in barracks and on the march. The subsistence of the army is his first duty, to which all is subordinate.

Military Telegraph Service.—In war times this includes three kinds of service, viz., that of the first line marching at the front; that of the second line, the line of communications; and the third or interior line, or territorial service. The employés of the first and second lines are recruited from the officials, employés and agents, of the national great lines of telegraph companies who are subject to military duties. These, in case of mobilization, are designated in advance, and organized for the services of the first and second classes in sections corresponding, as far as possible, to the regional army corps. The service of the third line comprises that of the net-work of fortresses or other military establishments, which is assured by the ordinary means of the telegraph companies. Military telegraphs are under the direction of the chiefs of staff of corps, divisions and armies.

Railway Military Service.—In war times the railway system is completely under the direction of military authority. The Minter of War has the control of all the railways throughout the national domain not occupied by the armies of operation. The commander-in-chief of an army or group of armies operating alone, has the control of the railways in the territory in which he operates. There are double tracks connecting the forts on the frontier line of defense with one another and with the chief cities of the interior, besides double tracks in each of the corps regions which can be used at the moment of mobilization. The Minister of War fixes the dates for the assumption of authority over the railroads for each army and line, and determines the lines of demarcation between the several zones.

The officers commanding have also under their orders the personnel of field sections of railways, organized by the great railway companies of the State, and railway engineer troops. Every railway company is represented with the Minister of War by an agent approved by him, whose duties in peace are to insure the

complete preparation for transportation according to the minister's instructions. In war, to receive the orders of the minister and direct their execution.

There is at present a superior railway military commission established by law, composed of representatives of the Ministers of War, Marine, Public Works and Railway Companies, the opinion of which is required on all questions relative to the employment of railways for military purposes.

Gendarmerie.—The armed police consists of the department gendarmerie of the Interior, organized into 28 legions, one for each army corps, with an additional legion for the 6th, 7th, 14th, 15th, 16th and 17th territorial departments; the legions of Corsica, Algeria and Paris, and the legion of the Republican Guard. When the army takes the field, the gendarmerie is especially in charge of the regimental trains. They also carry on the police duty in bivouacs, etc.

Officers of the Reserve.—There is a body of supernumerary officers, called "Officers of Reserve," from whom are recruited the officers to fill the required complement in the mobilization of the cadres of the active army. This body of officers is made up of appointments among the following:—

1st. General officers of the army and navy who are on the retired list, on their application for field service. 2d. Officers, officials and agents of the army and navy, retired after 25 years' service, until they have completed 30 years' service; and those who have served 30 years are admissible on their own application. 3d. Officers, officials and agents of the navy who will not be employed on sea service, and who desire to be included in the body of reserve officers. 4th. Officers, officials and agents of the army and navy who have resigned, but on account of age are yet amenable to military duty in the active army or its reserve; and those who have passed that age who ask to be officers of the reserve. Officers above mentioned must possess the moral and physical qualities required. 5th. Former pupils of the Polytechnic and School of Forestry. 6th. Officers who formerly belonged to the administrative departments may receive equivalent commissions in the reserves. 7th. Young men unattached or who belong to the reserve of the active army, who are doctors, pharmaceutists or veterinary surgeons, receive commissions in their specialties on presentation of the necessary documents showing their proficiency. 8th. Sergeants who have been released from active service but are

liable to service in the reserve and who have been mentioned by the chiefs of their corps as likely to have attained the rank of officer had they continued in activity.

The officers of the reserve corps are appointed by the President of the Republic on the recommendation of the Minister of War, who distributes them among the different corps as needed. As soon as these officers are called to duty, they are entitled to the pay, allowances and honors in use in the active army. Officers, officials and agents of the active army of like grade with officers of the reserve, rank them. An officer of the reserve who has never served in the active army, cannot in any case become the chief of a corps, or the commandant of a depot. The officers of the reserve corps pass into the corps of officers of the territorial army, if they do not request to be retained in that corps at the expiration of term of service in the active army and its reserve. The status, the manner and conditions of promotion of officers of the reserve corps, are governed by the special laws relative to officers in the active list.

Composition of the Territorial Army.—This army comprises troops of all arms, and is recruited in subdivisional regions for the infantry arm, and in the entire departmental region for the other arms. Each subdivision furnishes a territorial regiment of infantry of a variable number of battalions according to the strength of the recruitment, and a depot. The cadres of battalions and companies are the same as with corresponding units in the active army. Regiments are commanded by lieutenant-colonels. The number of battalions of each of these regiments and the composition of its depot party, are determined by the Minister of War.

The infantry of the territorial army includes battalions of *chasseurs à pied*, independent of regiments. The number of these battalions, their composition and the number of companies, are prescribed by the Minister of War. Each territorial department furnishes one regiment of artillery and a certain number of companies of the artillery train; one battalion of engineers and one squadron of military train. The cadres of artillery regiments, battalions of engineers, and squadrons of military train, and those of batteries and companies of which they are composed, are the same as the corresponding units of the active army, except that the artillery regiments are commanded by lieutenant colonels. The number of batteries and companies that form these units are determined by the Minister of War. Every battery and com-

pany of engineers shall have at least one-third of its members soldiers who formerly served in these arms.

There shall be formed in each corps region a certain number of troops of cavalry, depending on the supply of horses in the region. Soldiers who formerly served in this branch, and who are not included in these troops, may be assigned to other arms as deemed expedient.

The organization of the different administrative services is determined by the Minister of War. Over and above those belonging to the cadres of corps of troops, the organization of the territorial army includes a number of officers of the several arms who are attached in case of mobilization to the commanders of depots, commanders of lines of communication service, to the general staff of the interior lines, and to those of corps, divisions and brigades, composed of troops of this army. The personnel of the administrative departments of the territorial army is recruited, as far as officers are concerned, from officers in active service whose duties are similar to those required, and from retired and resigned officers who can fulfil certain conditions prescribed by the Minister of War. The non-commissioned officers are selected from those of the active army who have served 12 years, four of which, at least, as non-commissioned officers.

Formation of Units.—The division of an army into corps is the most advantageous that could be made, for, comprising all the essential elements of warfare, it possesses within itself the greatest degree of strength and mobility at the same time that it facilitates the exercise of command. It is, therefore, the strategic unit of grand armies, and when on a war footing usually contains the following units:—25 battalions of infantry (two divisions); 1 battalion of *chasseurs à pied;* 8 squadrons of cavalry; 20 batteries of artillery of 6 guns each; 8 ammunition sections (2 of infantry and 6 of artillery); 1 bridge equipment of 21 pontons, and a company of pontonniers; 3 engineer companies and one engineer park; 10 train companies; 3 administrative supply convoys, and a section of clerks and workmen; 1 field bakery; 4 ambulances; 6 field hospitals; 1 remount depot; 1 company gendarmerie, and 1 telegraph section of the 1st line, if required, numbering nearly 40,000 men, 12,000 horses, 120 guns and 2300 vehicles, and furnishing a fighting force of about 25,000 infantry, 1200 cavalry, and the above number of guns.

Infantry Division.—Each division of infantry is organized as

follows:—Division headquarters; 2 brigades of infantry; 2 groups, each of 3 batteries, of light artillery; 1 company of engineers; 1 company of train; 1 ambulance; 1 administrative convoy; furnishing a fighting force of about 12,000 infantry and 36 guns.

Infantry Brigade.—A brigade of infantry comprises:—Brigade headquarters; 2 regiments of 3 battalions, each of 4 companies; and numbers approximately 6000 men.

Corps Cavalry Brigade.—A brigade of army corps cavalry comprises:—Brigade headquarters; 1 regiment of dragoons; 1 regiment of *chasseurs à cheval* or hussars; 1 ambulance; and numbers about 1200 sabres. When necessary, a horse-artillery battery is attached to the cavalry brigade from the corps artillery.

Corps Artillery.—The corps artillery comprises:—2 groups, each of 3 light batteries; 1 group of 2 horse batteries; a total of 48 guns. The corps artillery commander has also under his command:—2 ammunition sections of the 1st Division (1 infantry and 1 artillery); 2 ammunition sections of the 2d Division (1 infantry and 1 artillery); and 2 ammunition sections (artillery) for the corps artillery.

Engineers.—Composition of a regiment of engineers of 5 battalions of 4 companies each and a company of engineer conductors:—

Colonel, lieutenant-colonel, major, five battalion commanders, surgeon-major (1st class), paymaster (captain), adjutant-major (captain), clothing officer, assistant-paymaster (lieutenant), color bearer (lieutenant), assistant-surgeon of 1st class, veterinary surgeon, chief of music, five *adjudants*,* drum-major, five drum or bugle corporals, sub-chief of music, and 38 musicians.

A company consists of a captain commanding, a captain 2d class, two lieutenants (1st and 2d), orderly sergeant, quartermaster sergeant, 8 sergeants, 12 corporals, 4 master workmen, 2 drummers or buglers, and 80 privates. Total strength of company, 112.

Train.—Composition of a train squadron of three companies on a peace footing (all cadres are doubled on a war footing):—Commanding officer, captain major, paymaster (lieutenant), clothing officer (lieutenant), assistant surgeon and veterinary surgeon, 2d class.

A company includes a captain commanding, captain 2d class,

* There is no equivalent rank in our service. "Sergeant-major" comes nearest to it.

second lieutenant and 91 men, including non-commissioned officers.

THE INFANTRY.

The French infantryman is energetic, wiry and tenacious. He possesses a certain *élan*—such as he displayed in the capture of the Malakoff and has shown on innumerable battle-fields—which his English and German neighbors do not possess, or even claim to possess.

His small stature and insignificant appearance have been severely criticised by casual observers, but it is a mistake to think that an infantryman must be a large, heavy individual, 6 feet in height and weighing nearly 200 pounds, to constitute an ideal soldier. A small, wiry, active city boy is apt to make a better foot-soldier than a large, overgrown, clumsy countryman.

The tenacity and stubbornness of French infantry have been questioned. It has been alleged that their fire and enthusiasm soon subside on meeting reverses, and despondency quickly follows, resulting in confusion, demoralization and defeat. Facts are against this popular but erroneous verdict. The victories during the 27 years of the Revolution were in a great measure due to the tenacity and determination inherent in the French character. The history of the Franco-Prussian War also disproves this popular belief. In that war, from start to finish, the French army was opposed by armies greatly superior in numbers, organization and command, and yet every battle, every position, was as stubbornly fought and contested as the first. They met with repeated defeats and with hardships and privations of every description, until destruction seemed to stare them in the face, yet they fought on, and contested every inch of ground with unfaltering courage and a tenacity of which their jealous friends across the Channel might be proud. The raw levies of Gambetta fought with the most determined obstinacy and yielded only to overwhelming numbers and superior organization. There was every cause for despondency, despair and consequent demoralization, but history does not record these results to any appreciable extent. The French infantry is also accused of want of endurance, which fallacy is amply disproved by the above facts, without noting that in the grand manœuvres of 1891 and 1892, French infantry in heavy marching order marched 3.7 miles per hour for several hours, without any apparent inconvenience, and this for several days. The French War Office recognizes the fact that an

infantry, skilfully manœuvred and ably led, is the factor of success in war, and that no battle of any magnitude can be won without it; hence the great care and attention devoted to the thorough organization of this arm of the service.

Organization.—An infantry regiment of the line, consisting of 4 battalions of 4 companies each, includes the following strength of units:—

	OFFICERS.	RANK AND FILE.
Company	3	125
Battalion	14	502
Regiment	56	1591
ON A WAR-FOOTING.		
Company	4	250
Battalion	18	1010
Regiment	72	3055

Each regiment has a colonel, lieutenant-colonel and major. Four battalion commanders, a surgeon-major 1st class, adjutant (captain), paymaster (captain), clothing officer, assistant paymaster, color bearer (2d lieutenant), surgeon-major 2d class, assistant surgeon and chief of music.

In each regiment the battalions are numbered consecutively from 1 to 3 or 4, and the companies in each battalion are numbered 1 to 4. The companies are divided into 4 sections, the 1st and 2d forming the 1st platoon, the 3d and 4th the 2d platoon. In times of peace there are 8 squads in a company, numbered by odd numbers from 1 to 15. These are doubled on mobilization, so that the companies are then divided into 16 squads and numbered 1 to 16, 2 squads forming a half-section. The distinctive colors in the infantry are:—dark blue for the 1st battalion, madder for the 2d, yellow for the 3d and green for the 4th. Each battalion has a flag for alignment, half white and half its distinctive color, with exception of the 2d battalion, which has a tricolor flag.

Infantry Equipment.—The infantry wear ankle-boots and carry the following articles:—Black leather waist-belt with two cartridge-boxes, meat-can, knapsack, a change of underclothes, pair of shoes and gaiters, two days' rations, cartridges in addition to those in boxes, overcoat rolled on top of knapsack with half-shelter tent, cooking vessel (1 for every 4 men), water-bottle and haversack (with one meal) slung over the shoulder. Every infantryman carries 120 rounds of ammunition.

Infantry Armament.—The "*adjudants*," first sergeants and drummers, are armed with swords and revolvers; musicians, hospital orderlies and train conductors with swords; the rest of the rank and file with the Lebel rifle. The following list will show the different arms now in use in the principal European countries:—

	MODEL.	NAME.	CALIBRE mm.	MAGAZINE.	CARTRIDGE.
France	'86	Lebel	8.	stock	8
Germany	'88	Mannlicher	7.9	box	5
Austria	'90	Mannlicher	8.	box	5
England	'89	Lee Metford	7.7	box	10
Italy	'87	Vetterli	10.35	box	5
Russia	'91	Mousin	7.62	box	5

The Lebel has not proved to be very satisfactory in Dahomey, while the Mannlicher proved very much so in the Chilean eight-day campaign. The French have been experimenting of late with the Paraldi and Berthier rifles with satisfactory results, and will undoubtedly exchange the present arm for one of them at an early day. It will take at least two years to arm the troops with a new weapon.

The paramount question in Europe to-day deals with the calibre of small arms. It is recognized that increased initial velocity can only be obtained by reducing the calibre so that the recoil may be supported, and the ideal gun must possess considerable initial velocity without a too-violent recoil. The general tendency is to reduce the calibre of the arms now in use, not only because of the recoil, but to obtain more initial velocity and to lighten the weight of cartridges which the soldier must carry. But this reduction has its limit, and it is generally considered it should not go below 6 mm. With an arm of this calibre there is obtained an initial velocity of 2100 f. s. and a point-blank of 600 yards, the trajectory not higher than man.

Infantry Drill.—The French infantry adopted the extended order of the Germans as the order of battle after the war of 1870. It is doubtful whether the dispersed order will be the battle formation in the next war, for there are not wanting military critics who are of opinion that the German army was victorious in that war in spite of its extended order line of battle, and not because of it.

A single line of attack,—which the line must necessarily be at the final charge, when all of the reserves have been absorbed

in filling the places of the dead and wounded,—when hurled against a similar line behind breastworks, is powerless and worse than useless—it is a total slaughter of the line. Victory favors the strongest line of attack, and a single line of skirmishers is not that. The scattered line is not only defective *per se*, but it is rendered more so by the dispersion of responsibility and consequent confusion. The problem of the hour, and one which has not yet been solved, is "What is the best battle formation compatible with the latest improvements in modern fire-arms?" However, the extended order is the system in which all armies are drilled at present, and our recently adopted infantry drill is almost bodily taken, as far as extended order is concerned, from the French, which smacks of German flavor.

The French close-order drill is very simple and easily learned by recruits. It differs from ours in the fewness and simplicity of the movements in company, battalion and regimental drills.

THE MUNICIPAL NEUTRALITY LAWS OF THE UNITED STATES.

By Captain H. C. CARBAUGH, Acting J. A., U. S. Army.

HAPPILY, instances requiring the United States to use her land and naval forces or militia in preserving her neutrality laws are few. The past two years, however, have furnished two notable ones—the Garza movement on the Rio Grande, in Texas, and the *Itata* affair at the port of San Diego, California. Both of these instances are of interest to military men, as they furnish opportunities from which to learn the extent of their duties and the application of their powers when called upon to execute the authority vested by the Constitution and statutes in the President, in respect of those laws. The acts, regarded as violations of neutrality, are defined as high misdemeanors in Title 57 of the Revised Statutes of the United States, Sections 5281 to 5286 inclusive, which sections also prescribe appropriate penalties for their commission.

The acts thus made criminal and prohibited are as follows:—Accepting and exercising a foreign commission within the territory or jurisdiction of the United States, against a friendly power; enlisting, entering, hiring or retaining others, within the territory or jurisdiction of the United States, to enter or go out of the United States for foreign service of a warlike nature; arming or procuring the arming of vessels within the limits of the United States for foreign service against a friendly power; arming or procuring the arming of vessels, by citizens of the United States, without the limits of the United States against the citizens thereof; augmenting the forces of a foreign vessel of war within the territory of the United States, and beginning, setting on foot, providing or preparing means for a military expedition or enterprise, within the territory or jurisdiction of the United States, against the territory or dominion of any foreign prince or state or of any colony, district or people with whom the United States are at peace. In this title is found Sec. 5287, "for the enforcement of the foregoing provisions." It reads as follows:

Sec. 5287. *In every case* in which a vessel is fitted out and

armed, or attempted to be fitted out and armed, or in which the force of any vessel of war, or cruiser, or other armed vessel is increased or augmented, or *in which any military expedition or enterprise is begun or set on foot, contrary to the provisions and prohibitions of this Title;* and in every case of the capture of a vessel within the jurisdiction or protection of the United States as before defined; and in every case in which any process issuing out of any court of the United States is disobeyed or resisted by any person having the custody of any vessel of war, cruiser, or other armed vessel of any foreign prince or state, or of any colony, district or people, or of any subjects or citizens of any foreign prince or state, or of any colony, district, or people, *it shall be lawful for the President, or such other person as he shall have empowered for that purpose, to employ such part of the land or naval forces of the United States, or of the militia thereof,* for the purpose of taking possession of and detaining any such vessel, with her prizes, if any, in order to the execution of the prohibitions and penalties of this Title, and to the restoring of such prizes in the cases in which restoration shall be adjudged; and also *for the purpose of preventing the carrying on of any such expedition or enterprise from the territories of the United States against the territories or dominions of any foreign prince or state, or of any colony, district, or people with whom the United States are at peace.*

The italicised parts (do not so appear in the text, but) if read consecutively will be found to give the law applicable to the use of military forces on land.

The orders received by the individual who is to act, when the time has come for action under this law, generally read thus, "You will take care that the neutrality laws of the United States are preserved" in the disturbed district. These orders produce about the same amount of astonishment and agitation as would a thunder-clap from a clear sky, for, while the existence of such laws is known, just what they are and what their proper application is, in the isolated cases requiring their enforcement, have probably not been the subject of special investigation by the recipient of the order. He who gives the order must necessarily confine himself to the language of the statute in order to avoid indefiniteness and for self-protection.

Those in the military service called upon to act in conjunction with the civil authorities, both Federal and State in the Garza movement, found themselves in a country where the land-marks

were but illimitable wastes of cactuses, of sand-hills or of mesquite; where even alkali water was a luxury; where violators of the law, devoid of distinction marks, were dispersed and concealed in dense thickets,—assembling with stealthy care, or in darkness liable to be broken for the pursuer at any instant by the gleam of a descending stiletto, and where the howl of the coyote often seemed the only friendly sound, for of him it was at least known, that he did not change his tones at will to suit either friend or foe.

Such circumstances required of those so employed, endurance, determination, patriotism, hard common sense, quick discernment and intuitive conclusions, to a degree that no other service could acquire. These circumstances, together with the harmonious working of the military and civil authorities, both Federal and State, to what might be called their grand success in suppressing the movement, have not and never will be half told.

The Federal executive authority especially placed the matter of preventing the violations of the neutrality laws of the United States in Texas in the hands of that part of the army serving in Texas,—successively under the command of Generals Stanley and Wheaton—and did not deem it advisable to employ to any extent extra force of deputy marshals. This, however, did not exclude the Federal authorities therein from active duties in the matter.

To preserve the laws it was necessary to prevent the organization in Texas of unlawful incursions into the territory of Mexico, and to capture, if possible, all persons who may have made such unlawful incursions; to use the most energetic efforts to break up whatever raiding or pretence of raiding there was across the Mexican border; to use the utmost vigor and energy to prevent further raids; to gain the earliest and fullest information of any efforts being made to get together bands of revolutionists against Mexico, and to capture any person or persons who might be preparing to violate the neutrality laws.

Under the statute and authority referred to, officers sent into the field had to seek information and to make arrests wherever there was reasonable cause to believe that such incursions were preparing or being made.

To do this did not necessarily involve the aid of the civil authorities, though a warrant of arrest for violation of such laws in the hands of a civil officer was, in general, reasonable evidence

upon which to arrest the party against whom it was issued; but the military, in making such arrest, would not be acting as a "posse comitatus," but would be acting under the above-mentioned authority. The presence of a U. S. Marshal with the military force was always deemed an advisable and satisfactory addition, and frequent arrests were made by such marshals under the immediate protection of the military.

One of the earliest laws on the subject (act of 1838) authorized the President to use the army to seize "any vehicle and all arms or munitions of war of which there was probable cause to believe were intended to be employed by the owner or owners thereof or any other person or persons with his or their privity in carrying on a military expedition or enterprise." This law has expired, but the same authority exists under the title (57) under consideration.

Persons arrested and property captured should be turned over as soon as convenient to the Federal civil authorities with proper complaints.

In performing the duties thus outlined, the officer in all cases is charged with knowing that the facts upon which he acts are such as are reasonable evidence of the violations intended to be prevented. In other words, there must be reasonable and probable cause for action, and this rule extends to arresting individuals, examining camps or bands of armed individuals, bands of suspicious persons, entering enclosures and entering houses.

An officer in the military service stands by virtue of his military authority in the position of a civil officer with or without warrant in his hands, and having in addition a military discretion which in its nature is judicial.

Officers sent into the field should not be deterred by presupposed actions for trespass or damage; by slander or libel; by danger of making false arrests; by difficulties in identifying fugitives through absence of any distinctive marks; by lack of exact information either of the country or of the people; by being misled through false information, or by difficulties in caring for prisoners or property after capture. To the difficulties here indicated the Garza movement added another, in the numerous names by which various individuals sought were known in the different communities.

Several times the Federal courts decided that prohibited military enterprises were on foot in Texas, respectively in September,

November and December, 1891. Until the pursuit was abandoned, or until the last participant in any of those enterprises, or in others thereafter inaugurated in the movement, was captured, driven from the States or surrendered, the enterprises were considered in law as existing and the foregoing principle applied to such participants whether as fugitives or as bands.

In connection with the last word the opinion of the Attorney-General of the United States with reference to the bands of outlaws which at one time existed in Arizona Territory, and which were known as "Cowboys" should be noted. "An armed body of men organized with a view to invade the territory of a neighboring people with whom we are at peace and to forcibly resist the public authorities therein, if opposed, may well be deemed a military enterprise in contemplation of the statute (see 5286), though the ultimate object is plunder." This decision is particularly descriptive of the numerous predatory bands infesting the Rio Grande country from Fort McIntosh to Fort Brown.

Out of both affairs—the Garza movement and the *Ituta* affair—grew trials which throw light on the neutrality laws. As to the former, I hereafter quote, as being instructive, from the charge of the Hon. Judge Maxey to the jury in the case of Ybaney, indicted for "beginning and setting on foot" a military expedition or enterprise against Mexico. He was convicted and sentenced in the United States Circuit Court, Western District of Texas. In applying the principles therein laid down, to an officer's duty in the military service, it must be remembered that in trial to secure conviction there must be proof of guilt beyond a reasonable doubt, but in preventing violations of the laws only reasonable and probable evidence of guilt is necessary to justify action by the military.

"This law (Sec. 5286 R. S.) has been carefully considered by Judge Judson in the case of the United States *vs.* O'Sullivan and others. His views, in the main, I will adopt and give to you in charge in this case. Before the jury can convict on this indictment, it must be proved to their satisfaction that the expedition or enterprise was, in its character, military, or in other words, it must have been shown by competent proof, that the design, the end, the aim and the purpose, of the expedition or enterprise, was some military service, some attack, or invasion of another people or country, state or colony as a military force. The engagement of men to invade or attack another people or country,

by force and strong hand—the designation of officers, leaders, the classification or arrangement of men, in regiments, squadrons, battalions or companies; the division of men into infantry, cavalry, or riflemen; the purchase of military stores, such as powder or ball, for an expedition, gives character to the expedition itself, provided there is sufficient proof to satisfy the jury that they are to be used.

"But any expedition, or enterprise, in matters of pleasure, commerce, or business of a civil nature, unattended by the design of an attack, invasion or conquest, is wholly legal and is not an expedition, or enterprise within this act. To constitute an offense under the law there must have been a hostile intention connected with the act of beginning, or setting on foot, the expedition or enterprise. This intended hostility, or this intended physical movement, characterizes the beginning, or setting on foot, an expedition; the one makes it military, the other not. How this distinctive character shall be shown depends upon the proof. The mere fact that men armed with rifles and supplied with ammunition crossed the Rio Grande River, from the territory of the United States into Mexico, would not be sufficient of itself to constitute a military enterprise with hostile intent, and we should require proof what they were to do and what their destiny was. Without such qualifying proof the expedition might still be lawful, but with it its military character might be established. The object of the expedition is an important thing to be considered. A specious covering, an artifice, secret movements, or deceptive proceedings may aid some in fixing the true character, or nature of the act.

"The term 'Expedition,' employed in the statute, is used to signify a march, or voyage, with martial or hostile intentions. The term 'Enterprise' means an undertaking of hazard, an arduous attempt. 'Begin' is to do the first act, to enter upon. We may say with all propriety that to begin the enterprise is to take the first step, the initiatory movement of an enterprise, the very formation and commencement of an expedition. To 'Set on foot,' is to arrange, to place in order, to set forward, to put in the way of being ready. After these proofs are made out the prosecution must further show that the beginning, the setting on foot of such expedition, or enterprise, was within the territory or jurisdiction of the United States, and to be carried on from thence against the territory or dominions of the Republic of Mexico is a

fact well known and does not require proof. You will see by care ful attention to this law, that there are certain acts which are declared to be unlawful and which are prohibited by the statute, to wit: to 'Begin' an expedition; to 'Set on foot' an enterprise; the expedition, or enterprise, in either case having reference to one of a military character. It is not necessary that both of these distinct provisions shall be violated to constitute the offense—the proof of either of them will be deemed sufficient. They are put in the alternative. It is not essential to the case that the expedition should start, much less that it should be accomplished. To 'Begin' is not to finish; to 'Set on foot' is not to accomplish. The language of the statute is very comprehensive and peremptory. It brands as an offense against the government, the first effort, or proposal, by individuals to get up a military enterprise in this country against a foreign one. It does not wait for the project to be consummated by any formal array, or organization of forces, or declaration of war, but strikes at the inception of the purpose, in the first incipient step taken with a view to the enterprise, by their engaging men, munitions of war, means of transportation, or funds for its maintenance. (2 Wharton's Criminal Law, 5th Edition, pp. 519–25.) This statute does not require any particular number of men to band together to constitute the expedition or enterprise, one of a military character. There may be divisions, brigades and regiments, or there may be companies or squads of men. Mere numbers do not conclusively fix and stamp the character of the expedition as military or otherwise. A few men may be deluded with the belief of their ability to overturn an existing government or empire, and laboring under such delusion, they may enter upon the enterprise. Now if a few men, whether 25, 50 or 200, 'Begin' or 'Set on foot,' within the territory or jurisdiction of the United States, a military expedition or enterprise, to be carried on from hence, that is from the territory or jurisdiction of the United States against the Republic of Mexico, they would be guilty of an offense against the statute. The proofs must establish in your minds the fact that the expedition, or enterprise, was of a military character, and when the evidence shows that the end and object were hostile to, or forcible against the Republic of Mexico, then it would be, to all intents and purposes, a military expedition. Again, the prosecution is bound to prove that the act of beginning, or setting on foot, a military expedition or enterprise, was

within the territory or jurisdiction of the United States, and you are instructed, in this connection, that the Western District of Texas is within the territory and jurisdiction of the United States. And the proof must further show that the expedition, or enterprise, was to be carried on from the territory or jurisdiction of the United States against the Republic of Mexico.

1. From the evidence you must be satisfied, beyond a reasonable doubt, that the defendants began a military expedition, or set on foot a military enterprise in the Western District of Texas to be carried on from thence against the Republic of Mexico.

2. The proofs must establish in your minds that the expedition or enterprise was a military expedition or enterprise. And evidence showing that the end and objects were hostile to or forcible against a nation at peace with the United States characterizes it, to all intents and purposes, as a military expedition or enterprise.

3. You must be satisfied, from the evidence, that the defendant did begin a military expedition, or set on foot a military enterprise as charged in the indictment, or was present actively aiding and abetting in the commission of the offense, before you can return a verdict against him.

"It is said, gentlemen of the jury, by the learned judge from whose charge I have already quoted, that 'The all-pervading object of this neutrality law is peace with all nations, national amity, which will alone enable us to enjoy friendly intercourse and uninterrupted commerce, the great source of wealth and prosperity; in short, to prevent war with all its sad and desolating consequences.' Such being the object of the law it is the duty of courts and juries to enforce it, whenever the occasion arises, with fairness and impartiality, but fearlessly and with firmness. While our own government affords protection and a safe asylum to upright, honest and liberty-loving people, it has the right to demand on their part, obedience to law and respect for our international obligations. And although a citizen, or other person, living under the influence of American institutions, may enjoy the utmost liberty consistent with public order, yet that liberty is a liberty regulated by law. It is not an unrestrained license conferred upon an individual to violate the laws with impunity and thus produce anarchy at home, or as the case may be, imperil the amicable relations which may subsist between our own government and that of a friendly foreign power. Men must obey the

law, else the social fabric falls. Independent states and nations must discharge their international obligations to each other, if they desire the maintenance of peace and the continuance of friendly intercourse. The evidence in this case makes it manifest that the executive department of the Federal government, with the active assistance and coöperation of the State authorities, has performed its duty in the endeavor to prevent a violation of the neutrality laws by dispersing armed bodies of men who, from the inception of the Garza movement until recently, infested the lower portion of this judicial district, and by aiding in the arrest of numerous persons supposed to be offenders against the statute.

"Let us also, gentlemen, perform the duty assigned to us. The defendant now on trial is charged with a violation of this law and it is for you to say whether he is guilty or innocent of the offense. Give his case a fair, candid and impartial hearing. If he be innocent do not hesitate so to declare. But, if under the evidence and foregoing instructions, you deem him guilty, then so say by your verdict."

As to the *Itata* affair, it will be remembered that the trials of Trumbull *et al* and the trial of the libels of the *Itata* and her cargo—all growing out of that incident--in the United States District Court, Southern District of California, resulted in the discharge from process of subpœna of the Vice Consul of Chile, on the ground that as he possessed an unrevoked *exequatur* issued by the President of the United States he must still be recognized by the Court as the accredited representative of his country, with the attendant privileges, notwithstanding the government which sent him had been overthrown; in the discharge of Trumbull, on the ground that the neutrality laws do not cover the act of purchasing arms and munitions of war and putting them on board of a vessel sent to receive them when they are not designed to constitute any part of the fittings or furnishings of the vessel herself; and of the dismissal of the libel in each case, on the ground that neither the vessel nor her cargo was liable for violations of the neutrality laws, as the cargo of munitions of war taken on board was not for the equipment, but for transportation to her country.

THE COMPANY MESS.*

By Lieut. V. E. STOTTLER, R. Q. M. 10th U. S. Infantry.

THERE can be no denying the fact that the happiness and general contentment of man both individually and collectively depends in a great measure upon the kind of food he eats and the manner in which it is prepared and served to him. Also, that the more nearly you can keep him on his familiar diet or on a better and more palatable course of food, the more happy and contented the individual becomes. By this I mean that anything in the nature of a retrograde in quality, quantity, or preparation of his food, becomes in short order a source of complaint and in the end complete dissatisfaction. Had the army the dieting of its members from early infancy, perhaps we might have soldiers who could be made to live on the simple food and cooking of the aborigines or of some of the less favored nations of the earth; but no such condition of affairs does or can exist, and in this question of food for the American soldier we must take under consideration his condition of life previous to his enlistment, otherwise we cannot get at a satisfactory solution of the problem of feeding him after his entry into the service.

Of course it is well known that a certain large percentage of our enlisted men is composed of the foreign born or those but one generation removed. We also know that the class of immigrant we receive has been accustomed to live in a most frugal and economical manner. It is stated on good authority that the laboring class of foreign countries from which the bulk of our immigrants is recruited, strive to live on as low as ten cents a day per head, and succeed to their evident satisfaction.

Optimists have argued from this, that as low a basis can be adopted for feeding them and their descendants when they enter the United States Army. But is this true? The total lack of meat in their diet, the preponderance of heavy black bread and garlic (both very cheap), have not been considered by those who have pointed to their food as an ideal, and argued for such a cheap basis for soldiers. Another thing, the phlegmatic temperament

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produced by a vegetarian diet is a strong argument against it for a soldier.

Meat, and plenty of it, strengthens the nervous system and produces that "get up and get," so essential to a live man and especially so desirable in our small army, where to-day we are striving to make working models and *thinking* machines and not automatons.

Are the American-born descendants of these immigrants content with the ten cents per day pabulum? Look about you and see. Their ancestors accepted their lot because they knew of nothing better, but the peculiar condition of life under American institutions makes of a man a somewhat different and a better being. We offer work in the United States at such wages as their contemporaries in other countries never dream of, and with plenty of cheap meat and wholesome cookery the American-born citizen gets a taste of a higher style of living which he does not with any pleasure contemplate leaving voluntarily. Even the foreign-born resident of our country in time comes to desire his three times a day modicum of meat and vegetables palatably cooked, and at the time of enlistment we must acknowledge that the recruit has been accustomed to at least good food and cooking. To make him contented in the army we must strive to furnish him as good, if not better, food than that to which he has been accustomed, for anything less will make him discontented, hungry and peevish, and will be likely in the end to lead to sighs for his old associations and to his ultimate desertion.

There is no doubt that a large percentage of desertions has been due directly or indirectly to the poor fare of the company mess. The mass of proceedings of Boards of Survey on this subject show general contentment with the ration that in my experience is not warranted by the facts. Company commanders and 1st sergeants do not favor "kicking" against their management of the ration on the part of a recruit, and he soon learns to do his complaining to his inner self and bide the time when he may satisfy his hungry stomach and allay his discontent by deserting the service he has sworn to uphold.

Boards of Survey have failed to get at this prolific source of desertion; first,—because the members are loath to make any official animadversions upon the administration of company affairs by their associates; and secondly,—because the non commissioned officers and men called before them, for obvious reasons

dislike to make official complaint of the methods of their superiors. One company which served at my station for some time, had for its daily supper bread and coffee. Its captain, who, by the number of his details on detached service evidently stands high on the records for efficiency, argued that they should be glad to get that, as the Regulations contemplated but one meal a day. Was anything more absurd? While I do not remember the percentage of desertion (quite high however) from this company, I do remember that in no case was it reported that a deserter complained of his ration, although the general dissatisfaction was a matter of notoriety at the post. In another case where the percentage of desertions was so large as to call for the action of an inspector, the Boards of Survey in no instance within my recollection reported complaints about food, although it was well know that the men had to take such messes as carrot hash for breakfast, or go to the trader's and buy something better, as most of them did.

I have seen companies with large funds and steady income live worse than their neighbors who had but a pittance on their account current. Where is the trouble? Most decidedly in the "management" and the cooking. If I am asked "who is to better the management?" I will say "the company commander." If asked "who is to better the cooking?" I will say "the company commander." His shoulders are broad and on them should be laid the blame if the company mess does not come up to the proper standard.

The value of the ration is about 20 cents. Not much more than the 10c. per day previously discussed, but, like the extra inch on a man's nose, it depends entirely upon where it is placed. The ration, as every one knows, is composed of fresh beef or salt meat, flour, beans or rice, coffee, sugar, pepper, salt, soap, vinegar and vegetables,—the latter but recently added by Congress and one of the best measures of relief passed in some time. These articles are issued in the proportions which the experience of years has shown to be sufficient to sustain life without in any essential particular laying the great republic open to the charge of undue extravagance.

In spite of all the claims of the Subsistence Department to the contrary, the furnishing of the ration *in puris naturalibus*, the construction of ovens, and the supplying of the manual for army cooks, are the sole connection between this great supply

department of the army and the stomach of the poor soldier. That "our army is the best fed in the world" is in no wise due to the Subsistence Department, but to the company commanders and cooks.

There are two systems in vogue for preparing and serving the ration, viz.—The general mess, and the company mess.

The former is of but recent introduction in our service and is in the interest of economy alone. In the opinion of the older company officers it is a doubtful experiment. The company organization is of course the unit, and this unit should be complete in itself whether in garrison or field, and this of course requires a number of trained cooks in the company who can be depended on to cook the ration with field appliances, so that it will be palatable to the soldier, whose stomach must endure it.

It is evident that this independence and mobility will be entirely destroyed under the general mess system. The company ordered away from the mess cannot take the chef with it, and even if it could it would be doubtful if he would stay with it. Sickness, wounds, or accidents (he might desert) might disable him, and in any of these contingencies the last plight of that command would be worse than the first. It is useless to say that, by detailing men from each command as assistants, the companies would in time have trained cooks. To put a man to watch a kettle of food cooked by steam may teach him to be a good sentinel, but never a cook.

On application some time since by my company commander for a cook, one was sent from a depot where the general mess was in use. When he arrived great things were expected of him of course. He was promptly installed in the kitchen as cook and as promptly asked to be relieved, as he knew nothing of cooking. Being questioned, he said his entire time at the general mess had been spent washing dishes. As a scullion he excelled; as a cook he was a dismal failure. Needless to say that no more cooks were applied for from that company. The system is undoubtedly excellent for recruiting depots, where the regimental and permanent company formation is not used, but for the company unit of organization the consensus of experience and opinion seems to call for the company mess as against the general mess. While more expensive perhaps, it results in greater efficiency, which should never be sacrificed to dollars and cents.

Par. 271 A. R. reads: "In camp or barracks company com-

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manders will carefully supervise the cooking and messing of their men. This duty is of the utmost importance and must not be neglected." The writer of that regulation understood what I have previously contended,— that the company commander must be made the "manager" of the company mess.

Par. 272 reads: "Kitchens will be placed under the immediate charge of non-commissioned officers, who will be held responsible for their condition and for the proper use of the rations." "Too many cooks spoil the broth," is an old adage, and "what is everybody's business is nobody's business," is another. Recent orders amend this paragraph by designating the first sergeant as the non-commissioned officer whose business it should be to carry out this important duty, but the amendment should go further and place *all* the responsibility for "proper use of the ration" on the company commander where such responsibility properly belongs. In two instances where I was company commander with a corporal in charge of the mess, it seemed impossible to have orders properly carried out with such divided responsibility, and the corporals were soon relieved and the entire burden thrown on the first sergeant, when the trouble ceased.

As before stated, the Subsistence Department furnishes the raw ration, bake ovens and the manual. There is no occasion to discuss the unfortunate circumstances under which the saving in the flour ration formerly went into a post fund. Suffice it to say, that it was a wise, just and beneficent order that eventually returned this saving to the company funds. In addition to this there are several sources of revenue for the fund,—gardens, post exchanges, amusement rooms, subscription, etc.

While not caring to discuss the relative merits of post and company gardens, I will say that I have not yet met a company commander who favors a post garden as against a company garden; but whichever is adopted, the vegetables furnished are a welcome addition to a mess and enable a certain portion of the ration to be saved and sold, the proceeds going to better the mess. The division of exchange profits helps swell the fund, and without discussing the "beer" question so persistently kept to the front by our temperance friends, I will say that the large profits from that commodity in time react. The hungry and ill-fed soldier will drink from sheer discontent, while when well fed and contented with his surroundings he does not crave his "grog."

The company amusement room is, or should be, a source of

considerable revenue to the fund. A billiard table is usually well patronized and is naturally nearly all profit, except for an occasional outlay for new balls and cushions. When it is well known that the returns go for the benefit of the mess the men will play much and pay promptly. This is where the "managing" of the company commander shows itself. I have known sixty dollars per month taken in from the billiard table alone when the proceeds went to better the mess, and I have seen the proceeds drop to nothing when there seemed to be a doubt as to whether the revenue would go there. Another case of action and reaction.

The question of voluntary subscription admits of argument *pro* and *con*. I have seen an entire company "chip in" every pay-day cheerfully, and I have seen them refuse to a man. It always depends upon what kind of a "manager" the company commander may be. It is a great pity that existing orders prohibit the company amusement room from dealing in articles kept by the post exchange. I do not include beer and wine in this, but cigars, tobacco, pie, cake, etc. The soldiers would spend more in their own company amusement rooms if they felt assured of a more direct benefit from the expenditure, such as might be shown by an improvement in their mess.

It would be wise to change the order prohibiting the court-martialling of a soldier for refusal to pay his just debts to an exchange or company amusement room. Since this order was issued others have been promulgated requiring all money, from whatever source received, to be accounted for on the company fund account. Company funds are public moneys under the law, as the latter makes them the property of the U. S. Treasury on the disbandment of a company. Therefore a refusal to pay a just debt to an exchange or company amusement room is an offense against the U. S. and should be triable. The refusal of one to pay is a precedent for another to do the same when no punishment is involved, and in the end makes the honest man discontented.

Not all companies have these sources of revenue, but most have at least one or more of them. Now with any source of revenue or none, what is the duty of the company commander towards its mess? According to Army Regulations he is "to supervise the cooking and the messing." The happy-go-lucky method of turning the whole matter over to the first sergeant, himself ignorant of the first principles of running a mess, is

highly reprehensible. Some system should be adopted and adhered to. There is no officer, I take it, who does not feel sure that he can spend the fund properly, and few who cannot spare the time to read a cook book occasionally. "Variety is the spice of life," and so it is of a mess. That does not necessarily mean a varied diet, but may properly be a varied cooking of the same diet.

Cooks are not so like poets as some think; they need not be born, they can be made. Cooking is a trade, not a talent. Some men have a natural aptitude for it, others attain perfection mechanically. The hue and cry of late years for "trained" cooks is, in my experience, uncalled for. There is no company in the service but has several good cooks, with plenty of raw material to fall back upon. The extra pay allowed the 1st cook has to a degree taken away the disinclination for long tours in the kitchen, and cooks now remain many months well satisfied to do the cooking. A high authority in a recent report, appealing for the enlistment of "trained" cooks at high pay, says: "The men so detailed are generally inexperienced, have little fondness or aptitude for the duty, and from the temporary nature of the duty take but little interest." Now there must be some mistake here or something radically wrong. If men are detailed according to roster, of course the ignorant go in as cooks; but are they so detailed? As a rule you will find a good cook as 1st cook with a less skilful man to help him, who, it is expected, will learn something of the trade from his more skilful chief.

We do not need men for 1st cooks who can cook for Delmonico. We need men who can cook the government ration with the ordinary concomitants added from the fund. These men can be found in numbers in every company, and need only to be *supervised*. By whom? The company commander, *of course*. If the men "take little interest" he alone is to blame. In an instance under my notice the dinner bill of fare, week in and week out, was "Roast Beef, Roast Potatoes, Bread, and Coffee." Is it any wonder the cooks lost interest? Do you suppose the company, too, lost interest in its dinner? It did, I assure you. Was it the fault of the ration or of the company commander? The latter, of course. It cannot be argued by any one that roasting is the only method for cooking beef. There are dozens of ways in which beef can be palatably cooked and furnish needed variety.

Now let us suppose a brand-new company commander to have gained a company and to be desirous of giving his company as good food as the ration and the state of the fund may warrant. How should he inaugurate his system so that he may exercise the control and supervision required? The first question will be the amount of the company's income irrespective of the ration. Ordinarily at a permanent station the company commander can depend on an average amount each month, whether large or small. This amount of course never should be exceeded in expenditure. No latitude whatever should be allowed the cooks in the way of expenditure. The first sergeant should have direct charge of the mess under the orders of the company commander, and a daily amount should be allowed him for expenses. He should be required to keep a book in which should be entered each day every expenditure for that day, and this book should be turned in each day to the company commander, who should inspect it and see that the average daily expenditures do not exceed the daily allowance. Any tendency to an increase should be summarily checked.

Cooks should incur bills only on the written orders of the first sergeant or company commander, and the regular tradesmen should be instructed to sell to cooks only on such orders, and especially should the beef contractor be furnished with this notice. All company commanders I presume have experienced the pleasure (?) of paying bills unexpectedly presented by the contractor for extra beef ordered by the cooks, in whose judgment and honesty the company commander has placed overweening confidence. Neglect of the above precaution will lead to trouble, annoyance and expense. Cooks are but human, and the cry of the hungry soldier for "more" induces the cook to give it him by hook or crook.

But one rule can be established. The company commander must have entire control, so that he can tell to a cent each day the balance of company fund on hand. In this way only can he supervise and direct. In nearly every company in which I have served, a happy-go-lucky method has been in vogue, by which the first sergeants and cooks bought what they thought desirable, and the company commander could not tell until the end of the month whether the expenses were $1 or $200. That is not supervision.

Having established this rule, it should be the duty of the captain each day to make out a bill of fare for the three meals on the

the 2d day thereafter, and each morning with the morning report the first sergeant should turn in the bill of fare for the next day. This will give the sergeant 24 hours to find out if the bill of fare of the company commander can be filled, and if not, he can make any desired change and the company commander will have 24 hours in which to approve or change. A copy of this, when decided on, should be furnished the cook, and no deviation allowed without permission, otherwise where the preparation of a given article involves extra trouble the cooks will substitute something easier. It will be found more satisfactory to make a machine of the cook and let the company commander furnish the brains.

But the objection will be made that not every one can make bills of fare. I doubt it. There is no officer but lives well, and would strenuously object if food were proffered him not properly cooked and palatable. He can easily pick from his own menus such preparations as he thinks would suit the men. Cook and recipe books are abundant, and by a little expenditure of time in judicious reading, no trouble will be experienced in getting up suitable bills of fare for the men.

"But the cooks do not know how to cook these new things," will be another objection. Write out the recipes and give the cook a copy; insist upon its being followed; try it again if not satisfactory, but *make* them learn to cook what you want. You will be surprised at the interest displayed by them and their aptitude. Cooking is a trade that can be learned. Copy all recipes into a book to be kept in the kitchen where the cooks can consult it.

I have spoken of the "Manual of Army Cooks." Naturally the company commander will turn at once to this for help, for Par. 275, A. R., says this "contains comprehensive instructions in the art of cooking." There are impracticable recipes in the book, but in the main there are many excellent ones, and with the use of some of the other first-class cook books on the market, the captain should have no trouble in varying the diet of his men even on the ration alone. We have potatoes, onions, tomatoes, rice, beans and peas in the ration, from which alone at least twenty soups can be made without extra cost, furnishing a dish at once palatable and always acceptable to the men. Of meat the ration gives beef, mutton, pork and bacon. Who will deny that many palatable dishes can be evolved from these four by a little management?

There is considerable complaint generally as to the toughness of government beef. This cannot always be helped, but there should be no excuse for poor quality. The contracts always favor the government in protecting the enlisted man, and a few summary condemnations will soon cause the contractor to know what will and what will not be received. Summary rejection of poor beef will have the result of causing subsequent contractors to bid high enough to enable them to put in a first-class article for the price bid. The remedy for poor beef has always been in the hands of the company commander, but I have seldom seen it used, they usually going no further than to have a prolonged growl over it. Tough beef can always be made tender under the old New England housewife's method of pot-roasting, but I have not often seen it used in the cook-house.

The flour ration will give a good variety in the way of flapjacks, fritters, rolls, biscuit, fried bread and sponge, but this is extra work for the cooks and only the supervision of the company commander will place these articles on the table.

Sugar is an article in my experience neither economically nor judiciously used. Too much saving is made on it. Nothing kills a hearty appetite quicker, and nothing gives more satisfaction at the end of a meal, than some well-sweetened article of food. Men are not ordinarily believed to care for desserts, but soldiers do, and if a pudding or duff or fritters, all well sweetened, be given to top off a dinner, it will be thoroughly appreciated.

Sunday dinner at least should be an extra good one. It is something for the men to anticipate. If possible have more than this one. The attention given by the company commander will not be thrown away. The men will be happier and more contented. They can feel that their material comforts are being looked after when their stomachs proclaim the glad tidings of substantial food; and that restless, anxious desire for a change, so prolific of desertion, will in a measure be done away with.

The demand for beer and other stimulants is an artificial one, much aggravated by poor food and discontent. Eliminate these, and everlasting squabbles in the squad-rooms from drunken men will become less and less.

The cooks will respond to every effort of the captain to better the mess. Every new dish satisfactorily cooked adds to their own value. They will soon be seen studying cook books of their own buying, and in short order the cooks and first sergeant will

be relieving the company commander of making the bills of fare by furnishing them themselves in advance. This has been my own personal experience. The company will soon have a number of trained cooks if a judicious selection is made in the details for the cook-house. There will be no trouble about cooking when a company takes the field. The cook who understands the best method of handling the ration in barracks, will not be found wanting in the field. The loss of the many concomitants of his table incident to field service will be endured as stoically by the soldier as it is by his captain. We all stand discomfort and privation when necessary. It is the unnecessary privation so often due to neglect and indifference of company commanders that engenders the army "growl."

Let the Regulations govern. Let the captain supervise the messing and the cooking of his men. Stop the boisterous cry for trained cooks. Train them yourselves. If you will hunt for the "aptitude" in the company you will find it. There is but one solution to the problem of messing men, and that is supervision and management. By whom? The company commander, of course.

THE EVOLUTION OF CAVALRY.

By Captain C. A. P. HATFIELD, 4th U. S. Cavalry.

BEYOND the time of which we have knowledge or tradition, there are reasons for supposing that man and the horse were intimately associated. It was domesticated among the Aryans, before their dispersion, and from Iran was taken to Egypt 1800 years B. C.; about which time it is also mentioned by the Hebrew writers. The biblical accounts of the horse are the earliest we have, and the most striking feature of these notices is its exclusive application to the operations of war.

Egypt was well adapted to the cultivation and development of the horse; here it multiplied and the people very soon became noted horsemen. The prophet Isaiah states that the Egyptian horsemen were the finest in the world. This country in time was able to supply Palestine and the nations of western Asia with horses for their chariots and horsemen.

On account, probably, of the hilly nature of the country in Palestine and the pastoral habits of its people, the horse was never a favorite, at least, not until the time of King Solomon, and then in the great part as a speculation; since it is stated that this monarch brought vast numbers of horses from Egypt, and that he would sell them to the nations to the east. Such was not the case, however, with the Assyrians and other peoples living on the vast plains of western Asia; here it was fully appreciated and met with high development and training. The formidable character of the swarms of mounted armed men of these nations, and the terror they sent to the hearts of such peoples as the Jews can be easily comprehended when we read the description given by the Hebrew prophets of the Assyrian horse, as "swifter than leopards and more fierce than the evening wolves," their riders are pictured "clothed in blue, captains and riders all of them, desirable young men," and again, in referring to the capture of Nineveh by the Medes as, "armed with the bright sword and glittering spear."

In those days the strength and importance of a people depended entirely on their horsemen and chariots. Contemporary with the early use of cavalry in war and closely connected with it,

was the chariot. They seemed to be used somewhat in the same way, and are frequently confounded; but the distinction has been clearly made in several passages in the Bible. Amongst others we are informed in Exodus, that the "Egyptians pursued and went in after them to the midst of the sea, even all Pharaoh's horses, his chariots and horsemen." Diodorus, the historian, tells us that Osymandias, the Egyptian ruler, took twenty thousand cavalry and went on an expedition to Bactriana to punish rebels; also that twenty-five generations intervened between Osymandias and Sesostris, the latter being credited with organizing the Egyptian armies and with being the chief author of the greatness of Egypt.

When it is considered that Sesostris lived prior to the Trojan war, some idea can be formed of the remote period at which cavalry was employed as an army. We have little information in regard to the trappings and management of the horse in those days, although specimens of the bit in use by the Assyrians at a very early date have been found in the ruins at Nineveh; but horses were ridden without saddles and unshod, those having hard, flinty hoofs being highly prized.

The arms assigned to cavalry by the earliest tradition are the lance, the javelin and bow. This is natural, and in proper sequence. After learning to ride, man sought a weapon, and selected a pole as best adapted to his horsemanship; this, subsequently sharpened and supplied with a spike for a point, became a formidable weapon. On becoming more accustomed to his horse the javelin was used, and finally, the expert horseman adopts the bow.

The people who have left us the earliest authentic records of the organization and arrangement of their cavalry, are the Greeks. Their historians state that they had their cavalry arranged into divisions about 750 years before Christ; that it was highly trained, not alone in evolution by squadron, but that much care was taken to develop lightness and agility in the movements of the individual. Believing that neither man nor horse would be up to their work in war unless practised during peace, Xenophon advised: "If you wish to have a good war-steed, you must try him in all those things which may be required in war. These are to leap across ditches, scramble over walls, spring up ascents, and dash down descents, and to be experienced in charging on slopes, uneven ground and transverse roads or paths; many horses fall,

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not for want of ability, but for want of experience in these things. Let them be instructed, trained and accustomed, and they will excel in them all, if they are healthy horses and not vicious."

Up to the time of Alexander their cavalry was divided into heavy and light; he added a third class instructed equally for foot or mounted service. Their heavy cavalry was selected with great care, for not only was it required that the individual possess bodily strength and activity, but proof also must be furnished as to moral worth. Both horse and rider were clad in mail, the arm being a long lance. The light cavalry rode unmailed horses, their weapon the javelin or bow. Neither kind used saddles or stirrups.

The tactical unit was 64 men and was formed 16 front and 4 deep, or 8 front and 8 deep. They would charge in line or lozenge-shape. These formations were heavy, slow and unwieldy. It remained for Alexander to revolutionize this cavalry before starting out to conquer the world. Everything was changed; he adopted the light, extended order, so well adapted to the movements of cavalry, allowing more men to attack at once, to disperse and rally, and giving them greater speed. This idea of reorganization of the cavalry by Alexander was obtained from the contact of the Greeks with eastern nations, the Persians in particular, those peoples who are naturally and instinctively good horsemen, and at this period possessed of formidable cavalry. Their methods of cavalry, so superior to the heavy, unwieldy order of the Greeks, was easily understood, and was adopted by Alexander with great success.

This was the order he used at Arbela. At this great battle, where Darius and his cavalry were completely overthrown, Alexander had 7000 cavalry divided into two separate bodies. He commanded in person the cavalry of the right wing, to which was opposed a largely superior number of Persian horse, clad in armor, the cavalry of the Greeks being light without armor. The Greeks having been thoroughly drilled for such an occasion, immediately extended their line by rapid movements, overlapping that of the enemy. This entirely confused the Persians, who, endeavoring to extend their line, left a gap through which Alexander with his assembled squadrons charged, separating the cavalry force of the left wing of the Persians into two parts, defeating and driving them from the field. Whilst in hot pursuit, Alexander, overtaken by a courier asking for aid for the left wing of his

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army, recalled his victorious cavalry and proceeded to the rear of the enemy's right. Finding his services no longer required there he again went in pursuit of Darius, arriving the following day at Arbela, a distance of 75 miles.

This exploit will always characterize Alexander as one of the great cavalry leaders of history, and his men as possessing wonderful discipline, endurance and energy. Defeating vastly superior forces by quick and decisive movements, recalling and rallying his charging troopers, going to the support of his left wing, again dispersing and pursuing the enemy 75 miles in one day, are models for all time. After the death of Alexander we hear no more of Greek cavalry; without its leader it soon became worthless.

The Romans succeeded the Greeks in power and influence, but we learn nothing of cavalry from them. Very little is said of it in their early history, and the proper use of what little they had was not understood. It was their custom at this time to mingle their cavalry and infantry. Their horsemen were apt to dismount to fight, but since the people with whom they came in contact knew no more than themselves, no evil consequences followed. Later on when they came in conflict with Gallic and Carthagenian troops possessing a fine cavalry, they felt their loss and endeavored to repair it by employing the mounted men of other nations.

Hannibal, the Carthagenian, who came so near destroying Roman power, was indebted for the greater part of his success to his cavalry. In his advance on Rome he had in his army Spanish, Gallic, and Numidian horse. The first two, particularly the Gallic, were far superior to any other cavalry at this time. They had been drilled in Greek tactics to the greatest perfection, were naturally fond of horses and acquainted with them from childhood. They were fine riders and constituted the most powerful auxiliary in Hannibal's army. The Numidian cavalry had come from Africa; they answered to the Cossacks of our day. They rode without bridle or saddle, guiding their horses with a leather thong, were armed with the javelin and were placed on the extreme wings of the army. Whilst the heavy cavalry was receiving the shock of the enemy, these light, nimble horsemen were sent forth on their fleet horses in clouds to surround the flanks. It is probable that by means of Greeks drifting into Africa and entering the Carthagenian army, these Numidians had acquired

an idea of Greek tactics. The battle of Cannæ, where the Romans under Varro lost 70,000 killed and captured out of about 86,000 men, was gained almost entirely by Hannibal's 10,000 cavalry.

It is difficult to understand in what way cavalry could have been managed and directed and how it was ever brought to such proficiency as to create such terrible havoc as was done on this day. The Roman infantry, 80,000 strong, true to its character, soon drove back the opposing infantry of the Carthagenians. It was different however with the cavalry. Hasdrubal, its leader, attacked with his 10,000 the 6000 cavalry of the enemy and soon routed them; sending his Numidian horse in pursuit, he broke in amongst the victorious legions with his regular cavalry and completely destroyed the Roman army, and this with a loss of 200 of his men. In this battle we see on the part of the Carthagenians pretty much the same tactics we saw at Arbela. The cavalry, after defeating the enemy on one part of the field, is recalled, rallies and attacks somewhere else. We all know the difficulties in such manœuvres as this.

We thus see that from Arbela to Cannæ, 117 years had apparently made little change in cavalry. The successful leaders were men unsurpassed in the art of war. The cavalry in both instances was without saddles, the horses unshod, the arms were spears, swords, javelins and bows. From the time of Hannibal, we must pass on many centuries, to the time of Frederick II. of Prussia, before we find another master of cavalry. During this long period we encounter many brilliant leaders, many valiant knights, large and powerful armies, desperate battles employing large masses of cavalry; but we see no one who, like Alexander or Hannibal, after skilfully using his cavalry to prepare for victory, knew when and where to start it to the destruction of the enemy. But in passing over this period of barbarity and ignorance a few occurrences affecting my subject may be worthy of mention.

During the reign of Constantine the saddle was invented, the stirrup being added by the Franks after their conquest of the Gauls. Whilst these inventions may have added nothing to the character of cavalry or to its effect in battle, they added greatly to the health and comfort of the mounted man.

The power of Rome being broken and the seat of government transferred to Constantinople, the kingdom in Europe de-

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manding the next attention is that of the Franks. At the time of their conquest of the Gauls, the strength of this people rested in their infantry, and cavalry was in little favor. From necessity, however, the cavalry of the conquered Gauls was soon incorporated in the Frankish army, and after a few centuries—at the beginning of the 8th—we see the French army composed almost entirely of cavalry, not so much from military policy, however, as on account of the peculiar constitution of the state. There was an unwillingness to entrust its defense to the lower classes, and this distinction fell to the nobility. The army was composed almost exclusively of this class, who from tradition being unwilling to fight on foot, went into battle on horseback. This was the origin of the knights—the strength of governments of the middle ages—a period when the armorer's art was in higher repute than the art of war.

The lance was the favorite weapon at this period, its staff being composed of hard wood, often carved, its head being about a foot long and very stout. Since, however, the fashion of the lance and of other arms depend entirely on the skill of the blacksmith and the taste of the individual knight, it is not worth while to attempt to describe them. A complete suit of armor often cost the knight a considerable fortune, but rendered him and his horse well-nigh invulnerable. Occasionally on being unhorsed and left on the field he would be attacked by several dismounted men, endeavoring to penetrate or crack open his covering. There were instances where knights, after being subjected to this treatment for several hours, were rescued with only slight bruises. We thus see, the knight, whatever his influence on the times, was hardly a cavalryman.

We saw the effect of eastern nations--the Persians—on the cavalry of Europe in the time of Alexander; again we see its influence about the middle of the tenth century, and this time from the Hungarians, who were essentially an eastern people. Early in the tenth century Europe was annoyed by inroads of the light, irregular horsemen of the Hungarians. We can imagine the result when this light cavalry, quick and concentrated in their attacks, loose and scattering in their retreats, came in contact with the heavy, unwieldy horsemen of Europe. As in the case of Alexander, the man for the occasion now arose, in the person of Henry I. of Germany. He quickly reorganized his cavalry, adopting, as well as he could with his heavy Germans, the sys-

tem of the Magyars, and finally defeated them, but through superior generalship.

We now pass on to the 13th century. This time the lesson comes from the Mongols. An army of them invaded Poland in 1241, and was met by one of equal size composed of the heavy, armor-clad cavalry of Poland and Silesia. It being contrary to their tactics to stand the shock of a charge of heavy cavalry opposed to them, the Mongols would give way and disperse. When the Europeans thought they had gained a victory and were exhausted in trying to catch their active adversaries, the Mongols, quickly rallying, would turn and decide the battle. Finally by the superior tactics, horsemanship and correct application of cavalry, these Mongolian barbarians gained an overwhelming victory over the Polish cavalry, which had no superior in Europe at that time.

The tactics displayed by these Mongolians on the plains of Poland in the 13th century, are the rule and foundation of the cavalry tactics of the present day. Notwithstanding the ideas gained by the Greeks from the Persians, by Henry I. of Germany from the Hungarians, and those taught by the Mongols in the 13th century, we again see that Henry II. of France, about 1540, forms his cavalry in oblong squares and in ten ranks. In the 16th century detachments of infantry are mixed with the cavalry attacking together in battle, this practice continuing for more than a century.

At this point Europe obtains, not a new idea, but the old one over again, from the Asiatics. On this occasion the Turks come in contact with the West. This people for a long time had the most formidable cavalry in Europe. Their horses, mostly drawn from Asiatic provinces, were active, wiry and easily managed. Their men, also from Asia, or descendants from Asiatics, were natural horsemen, finer than in Europe. This cavalry, with their few and simple tactics, with their sharp scimetars and yataghans, and a confidence and individual prowess born of a perfect knowledge of horsemanship and the use of their swords, would throw themselves in swarms against the Russian and Austrian cavalry or infantry and sweep all before them. Neither the fire of infantry and artillery, nor the discipline of the Christians could save them from such horsemen. Their only safety from annihilation lay in the *chevaux de frise*, with which every column was provided ; this being thickly planted as a barrier against the Turkish horsemen.

The Austrians and Russians learned much about the cavalry service during their wars with the Turks, this knowledge being put to good use by the Austrians in their first campaign against the Prussians in the Silesian war.

Frederick II. on ascending the throne received an army noted throughout Europe for its discipline and drill. The cavalry had been thoroughly instructed to fire on foot or horseback. They were large men on immense horses. They were taught to charge at a walk or trot. They were never allowed to go faster than a walk on uneven ground. At the battle of Mollwitz,—the first engagement of Frederick with the Austrians,—the imperial cavalry charged the Prussians in the Turkish style at full speed, sword in hand, sending Frederick and his cavalry flying from the field. Frederick received a deep impression from the action of the Austrian cavalry in this battle, and like his great predecessor, Alexander, began to learn from his enemy. At the end of the first Silesian war Frederick commenced the complete reorganization of his cavalry. There was no more firing in line. Everything was done to make good riders of the men. Following the precepts of Marshal Saxe, the most brilliant military man in Europe just preceding Frederick, the cavalry was taught to go at full speed for 2000 yards without breaking its array. Frederick's instructions say: "All evolutions are to be made at the greatest speed, all wheels to be done at a canter, cavalry officers must above all things form the men into perfect riders, the cuirassier to be as handy and as expert on horseback as the hussar, and well exercised in the use of the sword. Every squadron as it advances to the charge must attack the enemy, sword in hand, and no commander shall be allowed to fire, under penalty of infamous cashiering; the generals of brigades to be answerable for this. As they advance they first fall into a quick trot, and finally into a gallop, but well-closed, and if they attack in this way his majesty is certain that the enemy will always be broken. Every officer of cavalry must ever bear in mind that there are but two things required to beat the enemy, first to charge him with the greatest speed and force, and second, to outflank him."

We cannot be surprised at the deeds done by this cavalry during the remainder of the war, with such instructions and with Seydlitz and Ziethen as lieutenants. The world was in admiration of their performances, which were finally crowned at Zorndorf. In this glorious battle 36 squadrons under Seydlitz turned what

was almost defeat into victory, checking the victorious Russian cavalry and routing it from the field. It then returned and attacked the Russian infantry, which, being prepared to receive it, fought with great tenacity. After breaking the Russian masses by their furious charges, these horsemen would charge again and again the groups into which the infantry of the enemy would form for protection. In these charges the losses of the Russians were enormous, notwithstanding that the Prussians had been 12 hours in the saddle before charging.

Never before or since has the cavalry of any Christian nation arrived at such fame and glory as it did in the wars of Frederick. These squadrons under the guidance of Seydlitz finally considered themselves irresistible, riding down everything before them. In the later campaigns Frederick was accustomed to give only general instructions to his cavalry. In battle it was given a certain part of the field and left to itself. It can be said that it rendered a good account, since of 22 pitched battles, 15 were gained by the cavalry.

Whilst fire-arms had been in use for 300 years, at the time of Frederick's wars, we do not see that they made any apparent difference in the use and employment of cavalry. Finding his squadrons supplied with fire-arms, he restricts their use to rare occasions, and resorts to pretty much the same weapons as those used by Hannibal at Cannæ on the Roman legions, and with nearly the same result.

At the outbreak of the War of the Revolution, 1792, the French government had 37,000 sabres, divided among 14 armies. This cavalry, inferior in numbers and skill to that of the Allies, met with constant defeat, until in 1796 the French cavalry was destroyed at Wurzburg by 59 Austrian squadrons. When Napoleon assumed the direction of affairs, by means of his policy and conquest France was soon able to draw on Germany for horses as well as men. In the same manner that he organized and equipped large armies, he also prepared his cavalry on a gigantic scale, which, under the leadership of Murat at Jena and Auerstadt, was able in a single day completely to destroy the Prussian cavalry, which had been the model for Europe since the time of Frederick.

For several years after this the French cavalry was in the lead. Whilst its tactics and management were entirely different from Frederick's, still from the peculiar circumstances attendant

on the period, and with leaders like Kellermann, Murat, and Montbrun, it performed wonders.

Whilst the mind of Napoleon seemed able to grasp all subjects in the art of war in a way never seen before, yet we know that, in all his grand undertakings, cavalry had a secondary place. He was accustomed to assemble immense numbers, on occasions as many as 80 or 100 squadrons, and start them at the enemy, often with an enormous sacrifice of life; but of all his victories, Marengo can alone be claimed by the cavalry. The individual instruction and training of the trooper was below mediocrity, and his grand charges, which were ordered at a trot, were generally nothing but the stampede of a mob.

I will show how far below the standard of Frederick's squadrons were those of Napoleon, by quoting from the writings of Prince Hohenlohe, who, in describing the experiences of his uncle, a cavalry brigade commander in the Napoleonic wars, says: "My own uncle, who brought up a brigade against Murat's grand attack at Leibertwolkwitz, told me that his horse ran away with him. * * * It ran with him toward Murat's masses, and passed them within 10 paces. The hostile horsemen cursed him and struck at him, but not a single one had sufficient control over his horse to approach him, and all rushed on in the direction once taken, in a wild deep mass, without order and without stop. Hence it would seem that although Murat started the cavalry at a trot, it became, voluntarily or involuntarily, a run-away at full speed. Nor did they remain closed up, at least they did not preserve order, for my uncle describes them as 'a wild run-away mob.' He also states, 'They rode through some Russian batteries, when they were charged by some regiments of the Allies, which, although greatly inferior in numbers, drove them back as fast as they had come.'"

Whilst nothing was learned from the regular cavalry on either side during this period, a great impression was made on all the European nations by the irregular cavalry accompanying the Russian armies. What a contrast! On the one side masses and columns of Cuirassiers, Chasseurs, Lancers and Dragoons, in glittering array apparently without end; on the other the poor, despised, badly armed and poorly mounted Cossack. Before 1812 this half-civilized horseman was hardly known in Europe, and very little was expected of him on the declaration of war; but now it is generally admitted by historians, that the Cossack had more to

do with the destruction of the Grand Army than the burning of Moscow or Russian snows. Their style was very much the same as that of the Hungarians in the 10th century, and of the Mongols in the 13th. Whilst it was not their intention to receive the shock of a cavalry charge or to give one, there are instances in the war where they have defeated superior numbers of French heavy cavalry by simply separating, allowing the charging squadrons to pass through and falling on the flanks and rear with their lances. An army accompanied by these ubiquitious horsemen always reposed in confidence. No danger of surprise with the Cossacks in front. On the other hand the reconnoitring and scouting of the French cavalry was pretty well stopped on account of the constant destruction caused by those parties. Officers unable to bear intelligence from one company to another would frequently entrust important messages to the peasants of the country. On the entry of the Russian armies into Europe in 1813, we find a force of 3000 Cossacks, far ahead of their army, surprising and capturing the city of Hamburg.

At the commencement of the Civil War in our country in 1861, the cavalry art, so far as we were concerned, had apparently died. McClellan, full of science and theory and considered the greatest organizer and military man on the Union side, reported that very little cavalry was needed, the country being too heavily wooded and too much cut up for its use. Consequently in the first years of the war no cavalry to speak of could be found in the Union armies, and what there was could generally be found attached to divisions to perform orderly duty, etc. The Confederates, from their equestrian habits, naturally began to organize large bodies of mounted men, which, under the leadership of desperate, reckless men, such as Forest and Morgan, and when led by men of cool judgment and high talent, such as Stuart and Wheeler, began to inflict great damage to the Union cause. The method employed was to pass to the rear and around the opposing army, striking lines of communication, destroying supplies, and adding to the morale of their own men as well as producing a demoralizing effect on the enemy. During this period the Union cavalry dared not leave the protection of its infantry.

Hooker was the first Union general to consolidate his cavalry, giving it a separate organization under Stoneman. From this on to the close of the war we see the Union cavalry steadily increasing in strength and importance, until finally, under the guidance

of Sheridan, Wilson and others, and backed by the greater resources of the Union, it rendered the Confederate cavalry powerless for further raids.

The manner of fighting in the cavalry on both sides was generally dismounted, both in attack and in defense. Brigades were accustomed to dismount and form line of battle, and attack infantry in entrenchments. On a few occasions during the war the cavalry charged with sabre. It happened at Winchester that the Union cavalry, dismounted, after worsting a portion of the enemy's infantry, mounted and charged as cavalry, capturing 5 guns and 1200 prisoners. Commands of large size were given great independence, and, provided with an effective artillery, materially hastened the end of the war.

We turn once more to the most military nation in Europe,—Prussia. The war of 1866 shows how completely the art of cavalry can disappear. Not profiting by the lessons of Frederick or by its own reverses, we see the Prussian cavalry in this war far inferior to that of the Austrians. At the close of the war its inferiority was so apparent that a general reorganization of the cavalry was begun under Prince Frederick Charles, who by skilful and assiduous work raised the German cavalry to a much greater state of efficiency by the time of the Franco-German war. 70,000 German cavalry invaded France in 1870. Whilst the Uhlans and other light troops did good work in reconnaissance and in giving security to their armies, its work generally was a disappointment. This valuable service of the light troops was made easy moreover by the absolute worthlessness of the French cavalry, which, kept in rear of their armies, frequently interfered with the march of the infantry divisions.

Whilst the heavy cavalry was generally kept in the background through a feeling that its day of usefulness on the battle-field was past, it had opportunities of demonstrating that it could still be trusted under most unfavorable circumstances. When Bazaine with his veteran army of 180,000 men was endeavoring to retreat from Metz into the interior of France, he was intercepted and attacked by two divisions of German troops. Shortly after the commencement of the engagement, notwithstanding the arrival of slight reinforcements, the thin German line, exhausted, without reserve and support, and nearly out of ammunition, was in danger of annihilation from the French army. Having no other resources, a force of 800 cavalry was ordered to charge the French

infantry. This charge at Vionville, without special preparation, with no reserve or support, but made with that determination characterizing all the performances of the Germans in this war, was successful beyond expectation, and had the effect of deterring the French from an attack for which they were preparing. This, taken together with another successful charge of a larger body of German cavalry the same day at Ville-sur Yron, apparently paralyzed the French army, which was detained for 24 hours until the arrival of the German army, when Gravelotte and the surrender of Metz followed.

I have endeavored to show the condition and influence of cavalry at different periods of history from its origin to the present time.

Whilst the principles governing the use of cavalry have always been the same, it has varied at different periods in its mode of employment and importance. We have seen how natural it is for people of equestrian tastes, a people brought up and raised amongst horses from generation to generation, to make good cavalry; we know also the immense amount of work necessary to form cavalry from people of different habits.

Nothing has influenced the development of cavalry so much as the various inventions in fire-arms. The first thought that arises on the latest improvement of the arm, is that cavalry must necessarily be rendered much less useful. Whilst these inventions have necessitated a different manner of employing it as to time and circumstances of attack, its usefulness should remain the same. We must recollect that the infantry destroyed by the squadrons of Frederick had a dozen 12-bore muskets to the yard front, and that each man was able to fire his piece but 5 times in a minute. It is my opinion that the system of cavalry adopted and developed during our Civil War, together with the exploits of the cavalry around Metz, began a new era. At the close of the war of 1870, when the German government began preparations for a future struggle on a grander and more thorough scale than ever seen before, it was found that the performances at Vionville had left an indelible impression. Cavalry is fortunate in being taken in hand by the Germans, for with them, amongst all the nations of Europe, it is surer of a fair and perfect development. The Germans have to-day 93 regiments of cavalry, comprising 465 squadrons. Twelve of the regiments are cuirassiers—heavy horse; 34 regiments of dragoons and 20 of hussars are light

horse. Their 27 Uhlan regiments are an intermediate arm. All the cavalry are armed alike, with steel tube lances, carbines and sabres. They can all of them on occasion dismount and fight like infantry.

To show what can be expected of this cavalry in war I will close by quoting from the remarks of an Englishman, present at the manœuvres of the German army in September, 1891. After describing the country over which the cavalry was to charge as slightly undulating, with a slight stream about 2 feet deep at the bottom of each ridge, with an occasional rock or thicket as obstacles, he says: "During this time the two brigades had continued their march to the front against the enemy at the same regular gait, the shape of their mass having the clear cut outline of a picture, but on hearing the report of the first shot they formed in column of squadrons at full distance, at the same time disposing themselves in two échelons, of which the first contained two-thirds of the entire force of the column. Descending into another valley they were for a moment concealed from the artillery of the defenders, but on leaving this shelter, they found themselves fully in the zone swept by the enemy's shrapnel, They cleared the little stream situated at the bottom of the valley with perfect calmness, then, profiting by the shelter offered by the opposite slope, they formed line, and this movement completed, passed over the crest like a wall and at full gallop. When the brigades descended into the last valley which separated them from the enemy, I lost sight of them, but soon they reappeared, going at full speed over the last height."

He further states: "I passed in my turn the route traversed by the charge, and then discovered the cause of the disorder in the rear rank; it was a large drainage canal about 12 feet wide and 5 feet deep, the banks having a slope of 45°, which constituted a really serious obstacle. As could be seen by the horses' tracks, they had mostly slipped the first 3 feet and then leaped the remaining distance. A little further on I saw the reason for the command breaking into column. The road in this place ran into a cut and had a bank about 13 feet high. The cavalry did not see this obstacle until the last moment, but the squadrons were so completely under the control of their commanders that they executed wheel instantly; the foot-prints of the horses on the marching flank were not more than 10 feet from the edge. At the bottom there was a still greater surprise for me. There was

a water course 6 feet wide, in a ravine at least 40 feet wide and about 12 feet deep, which in a hunt would have stopped most of the hunters, but a horse battery and five regiments of cavalry cleared it at full speed, and that without having a single man unhorsed."

The writer goes on further to describe another charge, where both sides were composed of several brigades of cavalry. He saw these large masses, after passing over the country eight thousand yards at the walk, take the gallop and full speed for four thousand yards further.

We see at last, what cavalry in its highest development can do, and it but remains for the opportunity of war to demonstrate that the German cavalry, with the finest mount and the most perfect discipline ever yet obtained, has kept pace with the other arms, and can still retain the proud position cavalry had in the days of Alexander, Hannibal and Frederick.

"EXTENDED ORDER" AND "SKIRMISH FIRING" ASSIMILATED.

By Lieut. WM. N. BLOW, Jr., 15th U. S. Infantry.

EVERY science has its axioms which are admitted and all subsequent reasoning deduced therefrom. The science of war is no exception. Among its truisms, and lying at their very foundation, none is so often repeated than that peace is the time for instruction, war for action; that the soldier's acts under fire are but those of an automaton, repeating in a general way the practices of drill. Like the actor who has learned his part at rehearsals he is thrown out when he misses the cue; for in battle, as on the stage, only the slightest hint from his officer—the prompter—can reach him. As the fight is rehearsed so it is acted, and woe to the officer who has improperly trained his men, or attempts to deviate materially from the principles of said instruction.

On this is based all drill in Europe, and to such an extent is it there carried that German writers even insist that field officers should not ride to the front for purposes of instruction (at extended order drills), lest the men, accustomed to see them do so, will expect it of them in battle; holding that it is better to allow mistakes to pass until the drill is over, than to establish so dangerous a precedent. They base this on the assertion that many battalion commanders lost their lives in the war of 1870-71 in attempting to retain the confidence of their men by being forced on the firing line where they were accustomed to be seen.

They even abstain from shortening the distances between lines at drill, remembering how disastrous this practice of the barrack square proved to the Guard at St. Privât.

If all this be true, aimless and time-killing drills are not only useless, but positively dangerous. But to abandon aimlessness an aim must be supplied. It is easy to say "designate an objective, etc.," but it has been tried and is naturally a failure; for it is too much like child's play for a veteran captain of fifty to gravely inform his company "The bakery the enemy," and proceed to advance and fire on it, rally from and charge at it. Instead he prefers to march his company around the parade until recall.

However, some form of extended order must be practised, and since the parade ground furnishes no objective, and as the drill is further extended on the target range, why not combine the two, or rather abolish the extended order on the drill-ground and take up an appropriate system on the range when the targets will supply the lacking objective? To do this, one or the other system of fighting drill—that of parade or ranges—must be adopted.

Let us see which is desirable, and further examine the necessity of a change from our present double system.

At present we have two distinct and diverse battle tactics, drill and "skirmish firing." Both start the recruit at the beginning—squad and drill—and take him through the company in action, but by entirely dissimilar methods and commands. Thus we practice an attack on the parade, with empty rifles, and instead of supplementing it with loaded pieces, we begin at the very beginning and by a totally different system, with a wholly different object—that of record-making—we undo it. Worse still, this latter drill, carrying with it the spur of emulation, rewards and punishments, is more diligently and intelligently practised; which together with its close resemblance to actual battle, causes it to be more firmly fixed in the mind; hence it will supersede the ordinary drill in the excitement of battle, when the bugle, the clatter of musketry, the target like enemy seen through the smoke, will serve to recall the range, and banish the precise and noiseless extend order drill of the parade; while the din of action will prevent the officers from recalling the men to its teachings.

Suppose a war should break out, let us follow one of our companies in its first battle. It is ordered to attack and is deployed at a safe distance from the enemy. Having advanced for some time under the cover that an ordinary American landscape affords, it enters an open field of say 700 yards in width, on the opposite side of which the enemy has taken position, with a view of sweeping it with his fire. So far the men having suffered little, are cool and well in hand, and drill regulations have been observed. Two volleys are fired and an advance ordered. Now all is changed, the gait is quickened, the bursting shells, the roar of artillery and the cries of the wounded cause the commands of the captain to be unheard. However, he manages to halt them with the bugle, and "commence firing" is sounded; volleys are intended,—but will they be fired? No, it is now Blunt's turn, the predominating habits of the range obtain, and file-fire takes place.

Now was Blunt practicable for attack, it would be carried out to the end of the chapter, but alas! the men soon discover that something is wrong. The targets no longer stand waiting patiently to be counted, but reply with deadly effect. Thus, another cue being changed, Blunt in its turn vanishes from the minds of the men. Will drill regulations take its place? I think not. All is too different from the quiet order of the parade. The officers' voices can no longer be heard patiently correcting errors, and the men being trained in two systems, one of which is misleading and the other improperly drilled, they are thrown out of the ordinary rut, become unmanageable and demoralized, will hug the ground and expend their last cartridge, or seek safety in ignominious flight.

Possibly the above confusion would not occur at the second, but at some subsequent halt; all the worse, for the nearer the enemy the more disastrous its effects. However, it will certainly occur at the advance by rushes; for who will hear the complicated and long commands amid the perfect hell of sounds, of "Advance by rushes, first platoon fire two volleys, second platoon forward"; and "At the enemy at 500 yards, platoon ready, aim, fire, load?"

Such would be the inevitable result of our dual training—the imported fighting tactics (practised on the parade), and the home-made record drill of the range. On the other hand should both systems be so combined as to make range and drill, drill and hitting a target resembling an enemy, the same, with the practice devoted to both combined into one exercise, the men, having nothing to divert them, will fight according to its teaching; and when the clearing is reached, and the actual attack begins, old habits will take the place of thought, and although the instructions and commands of the officers are drowned in the roar of battle, when the familiar sound of the whistle or bugle is heard, what they are next accustomed to do they will do.

Grant but a fraction of the above, large or small, depending on the make-up, training or traditions of each officer, a change is necessary and a common system desirable.

The selection of one is next in order. Our drill regulations, with a few modifications, together with the latitude allowed in them, answers quite well. For, after all, the defects are not so much in the regulations as in their application.

I would suggest some such system as follows:—

A company having been drilled as far as extended order on

the parade ground, and having completed its known distance firing on the target range, is ready for extended drill and "skirmish firing" combined; the general principles of which can be learned on the parade ground during target practice by half the garrison at a time, the companies so engaged turning over their ranges to those practising at known distance firing. By occupying the entire day in this way (companies alternating) instead of an hour or two, as is the common practice, ample time is had to learn the principles of rallying, deploying, squad leading, etc., so that when the prescribed "skirmish season" arrives the command is ready to begin its practice. No time is lost from target practice, as a company progresses about doubly as fast with two targets as with one. Extended order of the squad, first with blank and then with ball cartridges, is then taken up in the place of "individual skirmish firing." They so closely resemble each other that little modification is needed to combine the two, and corporals receive practical training not only in leading their squads, but controlling their fire. I will now pass to company skirmish and extended order combined.

Send out scouts and "form for attack" at 2500 yards from the target, if the range be uninterrupted for that distance, as on a prairie; if not, under cover of such obstacles as intervene, and enter the opening in the formation prescribed by the drill regulations—*for that distance*, remembering *under all circumstances to treat the target as an enemy with loaded guns.*

Our ranges are not usually long enough to carry out the first part of an attack, neither are our parades or our battle-fields, so it does not much matter; however, at distances over 1000 yards the mortality is not great, and the men being in hand can be controlled by the officers, so little practice in this stage of the attack is necessary. If the range should begin with a hill at 1000 yards, the firing line would enter the clearing in line of squads. We will take the case of an unlimited clearing. One-third of the company advances under the second sergeant, followed by support under the first, and the reserve under the captain; at 1400 yards the firing line breaks into sections, at 1200 into squads, and deploys at 900. At 800 yards it is supposed that fire can no longer be restrained, so the firing line is halted and two deliberate volleys are fired. It then rises and advances to about 725 yards at a double time, lies down and fires 2 volleys.

This is kept up until about 550 yards from the target is reached,

when the support, having gradually gained on the firing line, joins it at a run and mingles with it. The first line is naturally carried forward by the impetus of this reinforcement and both move together to about 500 yards. During this 50-yard advance the lieutenants have divided the now combined lines into platoons and are ready for rushes, the commands for which are given at the next halt, as "First platoon, *rush*." The first sergeant leads his platoon and, having advanced about 20 yards, sounds his whistle, throws up his arms and falls back behind it. It then throws itself down (aligning on the most advanced men) and fires two rounds (ceasing at the next whistle). The second platoon then rushes, a specific time, say 40 seconds, being allowed from one signal to rush to the next; this will cause the men to move swiftly (as they will unquestionably do in battle) so as to gain time to fix their sights, load and fire. A premium is thus placed on rapid running and general quickness. Rushes are continued to 200 yards or less from the target, when the reserve, having gradually drawn near, joins the line, sights are laid down, bayonets fixed and rapid fire ordered, which should last say about one and a half minutes. In this time an average of about 12 rounds per man is fired. We may now suppose the enemy sufficiently shaken to allow an assault, and the charge is sounded.

But the enemy is not always so overpowered by rapid fire as to render the charge practicable, and as the drill regulations (like the trumpeter who loftily informed his commander that he had "never learned to sound a retreat") make no provision for withdrawing the company, we must select one, from the two alternations of breaking to the rear or retiring by échelons. Adopting the latter, the retreat will continue to about 500 yards, when the line is supposed to be relieved by fresh troops. It would probably be well to practice in both these methods—the successful and the unsuccessful attack.

The next run is exactly like the first, except that the men that were in the firing line now constitute the reserve, and the reserve the support, and the support the firing line. The third run will again change the men so that each soldier will have served in each line. In a short time the men will become so thorough in this drill as to execute it almost without commands.

Three runs constitute the collective firing of the company, preceded by the above-mentioned drill on the mid ranges; a preliminary consisting of one run with dummy, and three runs (the

men changing places as before described) with blank cartridges; this preliminary to be strictly carried out under the supervision of a field officer.

The Figure of merit should be determined by dividing the number of *hits* by the number of shots fired (not the number of rounds carried).

As volley fire is used in the proposed drill it may be dispensed with in its present form, and ammunition so saved devoted to such other practice as may be deemed best. At any rate two of the four volleys should be omitted.

Next, let us examine the amount of ammunition necessary for the above practice. To simplify the calculation I will only consider the unsuccessful attack.

Firing Line: From 800 to 500 yards, 5 series of two volleys each—10 rounds per man. From 500 to 200 yards, 9 series (counted cartridges) of 2 shots each, 18 per man. Rapid fire, 12 shots per man. Total, 50 shots per man.

Support: This line does not open fire until it joins the firing line at 500 yards, after which it fires as above, hence each man will fire 40 shots.

Reserve: Joins at 200 yards from the target, so only participates in the "rapid fire" and expends 12 rounds per man. Thus in three runs each man expends 120 rounds. Under the present firing regulations a man expends in 5 runs ("skirmish") 100 rounds, + 75 ("volley firing"), total, 175 per man, "collective firing." Omit 2 volleys and the difference is more than saved. Should the unsuccessful attack be drilled in one or more of the exercises, 18 rounds in addition to the above is required.

The above plan is based on "company acting alone." If it is desired to consider it as a "company in battalion," there would be but 2 lines, the reserve being supposed to be formed by another company. In this case *two* series of two runs each would constitute the collective firing of a company. The plan admits of further extension to extended order of the battalion.

To further enhance the resemblance to actual battle, the present motionless figures should be so arranged as to move like a firing enemy. This could easily be accomplished by having them rise and sink, at regular intervals, as men do in firing and loading from cover. They should do so independently of each other, remaining hidden about ten seconds and being exposed for the same time. The surface of the range should also be made to re-

semble that of an ordinary field by having small mounds, grass, or logs on it. The men would be thus somewhat weaned from the often impossible back position (only generally practicable for sharpshooters) and accustomed to seek cover and fire with a muzzle rest (unaided fire having been perfected at known distances).

The above plan, I know, is necessarily open to many objections, as will always be the case when an attempt is made to apply one system to such diverse conditions as peace and war. Among other questions it will be asked how officers are to divide up so great a distance in firing the prescribed number of shots? Simply by extending or shortening the time allowed for rapid fire by 15 or 20 seconds for each halt over or under the proper number. Should it be urged that some record-maker will purposely miscalculate his halts to secure an advantage, I have only to say that experience proves that no system can prevent fraud when its legal guardian is a party to it. It is true that some men will fire oftener at rapid fire than others, and about 10 surplus rounds should be carried by each man to allow for this, the remaining ammunition being counted after each run, to determine the *number of shots fired.* But it must be remembered that *too* rapid fire means fewer hits, and as just so many seconds are allowed for each man, the useful effect is obtained by the number of *hits, not shots fired.* At present we have no practice in this important kind of fire.

The only valid objection to the above plan is the danger of accidents in the rushes. This I am afraid is a necessary evil, but it is one that will also obtain in battle. And so timely precautions should be taken to reduce it to a minimum by having the men on the inside of rushing lines fire at the opposite flanks of the target, and by leaving a small interval between them (the échelons of the rushing line). By the exercise of a little care accidents will be exceedingly rare, not sufficiently frequent to interfere with so valuable a plan, I think. Besides, the fear of death should not be fostered in men who are paid to face it when necessary. At any rate the mortality will not be so great as that which would follow the adoption of the German officer's plan, that of making every tenth round ball cartridge in sham battles, to accustom the men to danger, and at the same time give practice to the Hospital Corps.

It is possible that men will get out of breath in the advance

under the above conditions. But so they will in battle, hence it should be anticipated at drill. This can be done by resting them, lying down or under cover, at some of the halts; always remembering, however, that the rest should be as short as possible, as the men are supposed to be under fire, and "the longer one is in the rain the wetter he gets," and that "long pauses encourage the enemy and deprive the attack of its aggressive character." This, like the length of the advances and rushes, the number of shots fired at halts, the kind of fire thus employed and the time between halts is an open question, which can only be solved with a company on the range.

I know there is a large class of officers who object to changes on general principles, urging that the present order of things is good enough for peace, and that in war we will learn again as we did in the last. We would learn, but too late. We did learn, but dearly paid for our knowledge, as many of the first battle-fields testify. The day is now gone—if it ever existed—when a nation can afford to lose its first pitched battle to an equal.

Let us briefly sum up the advantages of the above or some kindred scheme. Battle tactics is drilled, during which men are trained—under conditions resembling action—to reinforce both by groups and by mingling, thus taking the initiatory step of the mingling of lines of different organizations which is inevitable in battle. Volley firing, counted cartridge and rapid fire are practised in their proper places, and under circumstances that will be readily recognized in battle. Extended order on the parade is eliminated and time thus saved for other exercises, and lastly the thousands of dollars annually spent on target practice is devoted to developing a *habit* of fighting and to making our extended order interesting.

Our small arm is soon to be changed and with it our firing regulations. The above scheme is, I think, the direction which his change should take. That it is very imperfect, and in some of its features impracticable, is likely; but I firmly believe that the combination of "skirmish firing" and "extended order drill" is a necessity, and that on this principle the new firing regulations should be built.

Comment and Criticism.

(The remarks under this head have, generally, been invited by the Publication Committee, which desires that, as far as practicable, these "Comments" should appear under authors' names.)

I.

"Army Organization" (Capt. Zalinski).

Gen. Geo. W. Wingate, President National Guard Association, U. S. A.

THE article of Captain Zalinski possesses a merit which is not apparent in many of the articles upon similar subjects which have appeared in this and other publications, in that most of the ideas advanced are capable of realization. Common sense would seem to dictate that any plan, and particularly one of a military nature, must be based either upon conditions which exist or upon those which are capable of being secured. It is therefore surprising to those whose experience has made them familiar with the temper of Congress and the history of national and state legislation in regard to our military defense, to find officers of the army, of high as well as of low degree, producing articles, which, while showing elaborate research and calculation, have no more possibility of being accomplished in the United States than would an attempt to establish an empire.

All our military men know, or should know if they keep themselves conversant with what is going on, that for more than twenty years the National Guard Association of the United States has been using every possible influence to induce Congress to repeal the concededly absurd legislation existing in the United States Revised Statutes in regard to the militia, and to increase the federal appropriation for arming and equipping that body from the $200,000 which was fixed by Jefferson. That Association includes the leading National Guard officers of all the States, who are men of social and political influence and have the solid support of the press, and yet the only thing they have actually accomplished has been to increase the appropriation to $500,000 in 1887. Although they have had many conventions and have framed a carefully devised bill, which they have steadily pushed and which in Congress after Congress has had more than a majority of votes in its favor, they have never been able to secure its passage or to increase the appropriation to the million dollars which they desire, and which almost everybody concedes is less than ought to be appropriated. If a body like this cannot secure the passage of a bill which no reasonable man can object to, what can be expected for the plans "upon the Prussian system," or any other plan involving a substantial increase in the military forces of the country, whether they be called Regulars, Volunteers, or National Guardsmen? I would respectfully suggest a perusal of the recent debates in Congress on the "Cutting bill" as valuable to those writers from the army who are planning to recast our military system. It is submitted that experience demonstrates that in framing any practical plan upon such subjects the author must take into consideration the following notorious facts: First, that Congress cares little or nothing for the army; second, that the people at large are too profoundly impressed with our power to raise "millions of volunteers," to adopt, in time of peace, any

plan for organizing these volunteers when called for in time of war; third, that the majority of Congressmen are intensely jealous of every attempt by the national government to interfere in any way in regard to the National Guard, and that the simplest bill is attacked by some blatant blatherskite as an attempt "to convert the militia of the States into a federal standing army," a cry which is sufficient to kill the best legislation which can be devised; fourth, that the trades unions and the socialistic people (to whom Congressmen cater more than is supposed) are opposed openly, or covertly, to anything which tends to strengthen the military forces of the country; fifth, that many inland States, of which Delaware and Missouri are recent examples, will spend little or nothing for military purposes; sixth, that those States which have a well-organized militia are exceedingly chary of allowing any governmental interference with it, and that all the money which even these States are willing to appropriate for its support is so little that it is almost impossible to get any part of it diverted in any new direction.

It is greatly to be regretted that the United States, so far as its system of defense is concerned, learns nothing by experience. The following language used by Judge Story, in his work upon the Constitution written in 1848, in regard to the mismanagement and losses of the Revolution, could be applied almost word for word to the occurrences of the Civil War.

"Under the confederation, Congress possessed no power to raise armies, but only 'to agree upon the number of land forces, and to make requisitions upon each state for its quota, in proportion to the number of white inhabitants in such state'; which requisitions were to be binding; and thereupon the legislatures of each state were to appoint the regimental officers, raise the men, and clothe, arm, and equip them in a soldier-like manner, at the expense of the United States. The experience of the whole country, during the revolutionary war, established, to the satisfaction of every statesman, the utter inadequacy and impropriety of this system of requisition. It was equally at war with economy, efficiency, and safety. It gave birth to a competition between the states, which created a kind of auction of men. In order to furnish the quotas required of them, they outbid each other, till bounties grew to an enormous and insupportable size. On this account many persons procrastinated their enlistment, or enlisted only for short periods. Hence, there were but slow and scanty levies of men in the most critical emergencies of our affairs; short enlistments, at an unparalleled expense; and continual fluctuations in the troops, ruinous to their discipline, and subjecting the public safety frequently to the perilous crisis of a disbanded army. Hence, also, arose those oppressive expedients for raising men, which were occasionally practised, and which nothing but the enthusiasm of liberty could have induced the people to endure. The burthen was also very unequally distributed. The states near the seat of war, influenced by motives of self-preservation, made efforts to furnish their quotas, which even exceeded their abilities; while those at a distance were exceedingly remiss in their exertions. In short, the army was composed of three bodies of men; first, raw recruits; secondly, persons who were just about completing their term of service; and thirdly, of persons who had served out half their term, and were quietly waiting for its determination. Under such circumstances the wonder is, not that its military operations were tardy, irregular, and often unsuccessful; but that it was ever able to make headway at all against an enemy, possessing a fine establishment, well appointed, well armed, well clothed, and well paid. The appointment, too, by the states of all regimental officers, had a tendency to destroy all harmony and subordination, so necessary to the success of military life." (Story on the Constitution, p. 1179.)

The proposition of Capt. Zalinski to develop the military strength of the country by causing the youth in the schools and colleges to be instructed in military matters, is one

which is free from many of the practical objections which can be brought against the other plans to which I have alluded. It cannot be claimed by even a Populist or a Labor Reformer that it is increasing the armed force which is at the disposition of the Government; on the contrary, it places the people in position to resist the oppressions of such a force, if it should attempt any. It does not interfere with the militia of the States; on the contrary, it creates a body educated to enter their ranks and predisposed to do so. It does not require any legislation from Congress; on the contrary, it is to be carried out by the States themselves.

That instruction of this description would be most valuable to our scholars, mentally and physically, goes without saying. The great difficulty in our system of education, and I speak particularly of that in the larger cities, is the want of sufficient provision, or in fact of any provision, for the physical development of the scholars. In this we are far behind the schools abroad. It would be a perfectly simple thing, particularly in those cities where there are National Guard armories, which are public property and which are unoccupied in the daytime, to have them so used that each public-school scholar would receive at least two hours a week drill, and be taught to shoot, the most important part of a soldier's duty, and which if acquired in youth is never forgotten. The boys would like it, and it would do them good. In those places where there are no armories there are old skating rinks or halls or fields which are available.

The experience of Boston shows this idea to be practicable. It is further shown by the plan recently introduced in Jersey City and some other cities, by which certain Sunday-schools, desiring to secure the attendance of street boys, have organized military companies, the conditions of membership in which are obedience, disuse of profanity and tobacco, and regular attendance at the Sunday-school. The attraction of the drill and uniform has been so great that these schools now possess a number of companies, and the improvement in character of those belonging to them, arising from the habits of obedience and self-respect arising from their military instruction, has been marked.

Starting as the plan does with the endorsement of such a man as ex-President Harrison, it seems to be feasible to push it so as to make it by degrees extend throughout a large portion of the country. The proper way to do this is not by legislation, but by enlisting the public sentiment. The best organzation available for this purpose seems to me to be the Grand Army of the Republic. They have already in many States taken steps to encourage the growth of patriotism in the youth of the country by presenting flags to the schools and establishing patriotic exercises in them. It is extremely fitting that the members of the G. A. R., who have personally shown their devotion to the country, should exercise their influence in thus building up an organization which should supply their place. They are extremely sensitive to the aspersions which have been made upon them in regard to pension legislation, and would be more than likely to welcome and vigorously push a plan of this description, which would be regarded by the public as a patriotic work, free from any suspicion of personal advantage on behalf of those who advocate it. As they have posts everywhere, their influence would be great and far-reaching.

Since the above was written the Grand Army has actually taken up this subject. Lafayette Post No. 140, G. A. R., Department of New York, which claims the credit of originating the presentation of the National Flag to the public schools and the institution of patriotic exercises in them, presented to the Twenty-seventh National Encampment of the G. A. R., held September 7, 1893, a series of resolutions calling the attention of the order to this subject and urging its action. This was received with great favor and resulted in the passage of the following resolutions:

"WHEREAS, The policy of the United States in maintaining a small standing army leaves the defense of the country in time of war to rest upon hasty levies of volunteers; and

"WHEREAS, The rapidity with which wars progress in modern times has reduced the time available for the instruction of such levies to a very brief period; and

"WHEREAS, The Grand Army of the Republic recognizes the importance of making adequate provision for the formation of an effective force which will, after its members have passed away, fill the places which they once occupied in the ranks of the defenders of our country; and

"WHEREAS, This force, under the peculiar institutions of this country, can best be obtained by giving to the youths at school a preliminary military training which they will carry through life, and which will be of substantial benefit to them, physically and mentally, in the pursuits of peace, and it is therefore desirable that all American youths should receive military instruction at the earliest practicable age; and

"WHEREAS, The Grand Army of the Republic has been foremost in the patriotic work of inculcating a spirit of loyalty and devotion to our flag and country; therefore, be it

"RESOLVED, That the members of the Grand Army of the Republic cordially indorse the language of Comrade Benjamin Harrison, addressed to the National Association of Teachers, that 'The strength and defense of our institutions, not only in peace but in war, is to be found in the young of the land who have received from the lips of patriotic teachers the story of the sacrifice which our fathers made to establish our civil institutions, and which their sons have repeated on hundreds of battle-fields. The organized army of the United States, even if we include the militia of the States, is of insignificant proportions when put in contrast with the armies of the other great powers of the world. Our strength is not in these; it is in the great reserve to be found in the instructed young of our land, who come to its defense in time of peril.'

"RESOLVED, That this 27th Annual National Encampment is of the opinion that the Grand Army of the Republic takes a deep interest in all efforts to provide for the future defense of the country, and that it recommends an organized effort to impress upon the various municipal, State and National authorities the advisability of the adoption of a system by which scholars attending the public and private schools, as well as the high schools and colleges, shall receive instruction in military matters, and to impress upon the rising generation of the country the fact, that as American citizens it is their high duty to bring to the defense of their country, in its need, the education which they may have received in this particular in their youthful days.

"RESOLVED, That it is the recommendation of this National Encampment, that the Department Commanders give especial attention to the accomplishment of this object through a staff officer, and that the posts in the various cities, towns, and villages, by committees, public meetings, and other means, give their earnest coöperation and support in securing necessary legislative, municipal, and school-board action, as well as to obtain, where required, national aid by provision of arms, equipments, and instructors."

When such a powerful organization as the G. A. R. which interests at once the people and the military element has declared itself in this manner in its favor, this project may be considered as having been auspiciously started.

Opposition is of course to be expected from the teachers. These, as a rule, appear to be so anxious to teach their scholars everything—and a good deal more—that they really teach them but little thoroughly, which is the only teaching that is valuable. Most teachers are so anxious to develop their pupils' intellects that they fail to realize the necessity of developing the body in connection with the mind, and resent any attempt to interfere with the hours devoted to tuition.

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Another difficulty, although a minor one, is as to how the necessary military instructors are to be obtained. This, however, could be gotten over in some cases by detailing an army sergeant, who would gladly act for a few dollars a month extra pay, and in others by volunteers from the National Guard. The latter are easily obtained now to drill many cadet corps belonging to different regiments, and there are quantities of young men, officers and non-commissioned officers, who would be glad to devote their time occasionally for this purpose. In large cities an army officer could be well spared for this purpose.

The carrying out of the system proposed is unquestionably a long and difficult one, but it is one which is capable of being carried out, and if this should be done it would be of great military value to the country.

The necessity in particular of requiring that those colleges which receive the benefit of the detail of a regular officer, should utilize his services to the utmost in training the students so as to fit them for officers, is of the highest importance. The instruction there given should not be that of a drill sergeant, but should be such as to fit the students to accept a commission. All the suggestions made by Captain Zalinski on this point merit hearty approval, and it seems to me to be the duty of the War Department to insist rigorously on the proposition that no college shall receive the benefit of the services of an army officer, unless a sufficient number of the students submit themselves to his instruction, and he is allowed latitude to accomplish enough in the above indicated direction to justify his detail.

The suggestion permitting a number of commissions in the army to be given to such graduates in the colleges as stand highest in their military department would be a most wise concession, and would do more to induce the students to take a lively interest in their military work than almost anything which could be devised.

The suggestions in regard to the Military Academy at West Point impress me most favorably. This is particularly the case with the proposition that the Academy should be thrown open to the attendance of scholars whose parents would pay for the expense of having their sons educated there, and who would waive any claim to commissions in the army. The only objection that occurs to me in regard to it is that it might possibly be claimed that it would tend to make a class distinction. I do not think, however, that such an objection would have any substantial foundation. Of coarse the young men would be enlisted like the other cadets. If they drew no pay and paid for their uniforms and other expenses as the one year volunteers do in Germany, our congressional economists could not well interpose any objection to the substantial advantages to the country of increasing the number of young men who will receive a military training, and then pass into civil life, from whence they will appear when volunteers are called for, as was the case with Grant, Sherman and many others of our generals, with minds broadened and enlarged by contact with the world. With them too a higher standard for admission could well be imposed, something like what is required in other colleges. It would seem that this plan has no drawback and many merits to commend itself to the public in general. There are many men—I, myself, am one—who would be most happy to have been enabled to send their sons to West Point for the benefit of the mental and physical training which it affords, and would have been glad to pay for it more than their education in Yale or Harvard would have cost. West Point is an institution which is free from the objections which exist in many colleges, and the stern discipline and military instruction which it gives is highly regarded by many who, while they do not wish their sons to belong to the army in time of peace, would like them to possess the training which it gives, in order to prepare them to serve their country efficiently in time of need.

Captain Zalinski's ideas in regard to the wisdom and necessity of providing by law

for the raising, officering and instructing the volunteers and conscripts upon whom the nation must rely for defense in time of war, as well as the general details of how it can best be done, are sound. Personally I am inclined to think that history shows that a system of general conscription in the first instance is wiser and fairer than the calls for volunteers, with the accompanying Government, State, county and town bounties to stimulate enlistments, which characterized the Revolution and our Civil War, imposing as they did heavy burdens of taxation, and by degrees lowering the standard of our soldiers. But this I feel to be so opposed to popular sentiment as not to be worth discussing. I regret to say that experience teaches me that the prospect of inducing Congress in time of peace to pass such a law as Capt. Zalinski suggests, or any law to establish a system of volunteering, and for conscription in case volunteers fail, is even more idle. Our people and our politicians are saturated with the idea that we are too big, too strong and too rich to fear anything from any other nation. Such affairs as that of Siam do not affect us any more than if they occurred in another world. On the contrary, those who regularly pay insurance against fire or accidents scoff at the idea of preparing for war, although history teaches it is fully as likely to happen, and usually comes, not only unexpectedly, but so hurriedly that there is little chance for preparation (as is strikingly illustrated by the recent threatened breach between France and Great Britain, when the injudicious actions of a hot-headed subordinate might have plunged the two nations, who were in perfect amity two weeks before, into a bloody and costly war).

In regard to the suggestion of making additional appropriations for the National Guard, I can only say that the National Guard are "hustling" their very best to get these and will accomplish this if it is possible. In the days of Speaker Reed, when the treasury was overflowing, we had high hopes of success; but Reed turned out to be "a broken reed" to lean upon and went in for pensions instead of the National Guard, and the chances for the immediate future are very poor.

The question of arms is a most difficult one and one which it appears difficult to provide for. We have adopted a new small-bore repeater, but it will take at least five years, I understand, before such a supply of them can be manufactured as would be of any practicable value for national armament—even if Congress should regularly make the necessary preparations to keep the armories busy, the doing of which is doubtful. In case of war, we would therefore see, as in 1861, our hasty levies largely armed with guns picked from the scrap heaps of Europe, and therefore, by reason of their armament, placed at an additional disadvantage with any regularly organized foreign force.

When Norway changed its rifles, a sensible plan was adopted with the discarded guns, which were, like the Springfield, serviceable, accurate guns of 45 calibre. They were placed at the disposal of the local authorities in the different subdivisions of the country, and any respectable person could be loaned one for target practice upon application ammunition being supplied to him at cost. The result was the formation of numerous rifle clubs, all over the country, and a general knowledge among the people in regard to shooting which has become very valuable in a military sense. It is probable that for various reasons this plan would not be practicable in the United States, yet it would be a most valuable thing for the country if something like it could be introduced into the colleges and high schools, so that each boy large enough to carry a rifle could receive one and be taught to shoot. This is of great importance, as the time that is required to instruct troops in firing accurately is one of the most important factors in making them efficient within the short time available in modern warfare. There can be but little doubt that the number of young men who would be anxious to learn to shoot, if they could do so at little expense, would be much greater than the number of those who are willing to submit themselves to the restraints of military drill.

It is certain, whether this plan is adopted or any other, that large reserves of small arms are indispensable to any plan for providing an effective force for the national defense.

Captain Zalinski's idea of fixing the numbers of the regular troops at a prescribed ratio to the population would be a most wise course to adopt. It would tend to remove the question from annual discussion in the halls of Congress. There would not probably be any particular difficulty in securing the passage of a law by which the ratio of the army should be fixed at about what it now is, by showing that it would not materially increase the army. The fact that it might do so in the future, provided the population increased, would not be considered any serious argument against it. With this ratio once established and incorporated in the law, the army could quietly increase its numbers as the population increased, without anything being said about it and as a matter of course. This would be much easier for the army and save it from the attacks of demagogues, who now consider it to be an easy subject on which to air their ideas of economy.

Captain Zalinski's ideas with regard to rifle practice naturally meet my approval, and ten years ago I should have said they were capable of being carried out. To-day I doubt it, and the reason for my doubting it more than anything else, is, the attitude taken by the army itself in regard to this matter. It is true that the army has established competitions and has trained its soldiers to shoot, and to shoot very well. It also introduced skirmishing, which was a new departure, and in the Western States and on the Pacific coast it has done considerable towards advancing rifle practice among the National Guard, and consequently among the people. In the East, on the other hand, its influence for a few years has been distinctly adverse, and has done military rifle practice serious injury. For a number of years the army sent teams to compete for the "Hilton Trophy" at Creedmoor, and their members shot in the individual matches. The idea of shooting against these teams attracted the representatives from the National Guard of a number of States, and made the competition one of general rivalry, and therefore of public interest. After being beaten for a number of years, the army at last attained sufficient skill to win the trophy several years in succession. After having done this they stopped, and since then they have not only not sent teams for this trophy, the competition for which was established by Major-General W. S. Hancock, but do not even condescend to send an officer or single man out of all the troops in the vicinity of New York to shoot in the matches of the New Jersey Association and National Rifle Association at Sea Girt.

According to sporting laws, a man may quit at pleasure provided he "quits a loser," but so long as he is a winner, and claims by virtue of being such winner to hold the championship, he is bound to submit his claims to such championship to competition. Scores by which the army teams have won this trophy have been since beaten by National Guard teams, which ends the idea of championship, or even of superior skill. The result of the army's not appearing is (as was stated by the *Army and Navy Journal* in its editorial of September 2, 1893) that the National Guard of the States are inclined to think the contest is not worth while for them to engage in. Their argument is that if these competitions were valuable in a military sense, the army, as professional soldiers, would make a point at any sacrifice to participate. As they not only do not participate but do not even send an officer to observe the shooting, it therefore follows they are not valuable, and if not valuable enough to induce professional soldiers who "have all the time there is" to compete, why should National Guardsmen who give their time, leave their business and make the personal sacrifices that are necessary in order to participate in the matches? And further, if a State team does not shoot for the "Hilton Trophy," why should regimental teams be organized to shoot

for State trophies, and the logical conclusion is "what is the use of rifle practice anyway?"

At the matches in Sea Girt on August 25th, the Governor of New Jersey, and all the leading officers of the State, were present, nearly all of whom, including the Governor, personally shot in the individual matches. There was no commissioned officer or private present from the army and there was but one competitor from the States of New York and Pennsylvania. If the army had given it to be understood that they would be represented, there would have been fifty men from each. The excuses which had been made in the past in regard to sending teams to Creedmoor, had no application to Sea Girt. The ranges, camping ground, tents, including camp equipage, was placed at the disposal of all the competitors, and nothing was spared to make them comfortable. If for some unknown reason transportation from Governor's Island could not be obtained, an enthusiastic officer who considered the practice valuable, might have marched his men down there, and in so doing given them a valuable experience and demonstrated to the country the value the army placed upon military competitive rifle practice. As it is, the lesson which is to be derived is that the army, or rather the army of the East, attaches no value to it.

I do not make any reference to the talk which is common in National Guard circles, that the army does not compete because it is afraid it will lose, because I have too high an opinion of its skill. I do ascribe it, however, to the idea which appears to be so prevalent among army circles, in the East more than the West, of regarding themselves as a select class, wishing to do everything in their own grounds, in their own way and aloof from all outsiders, an idea which is fatal to any attempt to utilize their professional skill towards advancing the general military strength of the country.

Without discussing in detail any other of the features which are contained in Capt. Zalinski's admirable paper, I would suggest that there is one simple and practical way by which to develop the military resources of the country which few writers have suggested. That is for the officers of the army to go and do it, without asking any legislation from either the Government or the States. In other words, as Horace Greeley said, "The way to resume is to resume." There are a hundred ways by which, if the officers of the army desire, they can not only improve it, but help the National Guard, and bring together the two branches of the service so that one will profit by the other. This is being done to a considerable extent already by the quiet action of officers in various localities. A short time ago troops were on the march to Fort Snelling, to unite with the National Guard of Minnesota in a joint encampment. Light Battery K, 1st U. S. Art., Capt. Dillenback, has recently performed a practice march to the New York State camp at Peekskill, in connection with the batteries of the National Guard of that State, with great benefit to them and to it. During last year and the present, officers of the army have been acting as instructors in the new system of drill in the Peekskill, N. Y., camp. They have also acted frequently as instructors for the National Guard in other States, and in Delaware one of the officers detailed to a college was for a time practically the commander of the National Guard of the State, and a very good commander he was.

Yet, a few years since, when the writer, in drafting a bill for the National Guard Association to improve the Federal militia law, inserted a clause *permitting* the Secretary of War, at the request of the Governor of a State, to detail an officer to act during the Governor's pleasure as instructor for the National Guard, the suggestion met with no support from the army, and with such opposition from the National Guard that it was several years before he could get it inserted into the bill. Prominent among those opposing this plan were certain leading National Guard officers, who although the bill itself never became a law, have since been almost the first to carry out the idea themselves.

The manner in which military rifle practice gradually spread throughout the country and in the army is an indication of the way in which these matters can be handled without regard to legislation. After New York State began to teach its troops to shoot, General Abbot quietly began to instruct his Engineers, and to select teams to compete at Creedmoor, and in a very brief period the Engineers more than held their own. In Texas, in California, and other Departments, General McDowell and other leading officers of the army required their commands to take up the same subject. These examples were followed by State after State, officers and men doing the best they could—getting an appropriation where they could, and doing without it if they could do no better—until finally the practice became almost universal. And this without any official sanction from Washington.

There is nothing I know of to hinder the establishment of practice marches, for short distances, in which detachments of the army and the National Guard could unite, and where for a few days all the customs of the service in regard to field duty could be practiced by both organizations. In fact, a competition might be established with advantage, of long distance marches in heavy marching order, the winner to be the captain who should bring his men in in the the best condition and in the shortest time.

Neither do I know of anything which would hinder the army authorities, where there is a sufficient force of troops, from establishing camps of instruction, and inviting National Guard officers of the vicinity to unite in them, provided they paid their expenses. There are many officers and non-commissioned officers who are desirous of improving themselves, and who would be willing to give their time, and in addition, would also be perfectly willing to pay for their subsistence while in such a camp during their summer vacation.

Let us suppose that an officer having a command near a large city containing some National Guard regiments desires to take a step in this direction. He works out a plan for a march between two neighboring points affording suitable ground (as for example from Willet's Point to Creedmoor), as if through an enemy's country, and then invites the National Guard officers of the vicinity to coöperate in carrying it out. To secure thorough instruction parties of regular and N. G. officers, bicycle scouts, etc., are from time to time sent along the proposed route to reconnoitre and map it, and to impress upon all concerned how this work ought to be done, are required to submit their maps and reports for criticism and discussion to joint meetings of the officers who have agreed to participate. The problems connected with the proposed manœuvre relating to the calling out and transporting, marching, provisioning and fighting the command, are also submitted, studied and discussed in the same way, until all that can be obtained from the theory of the matter has been learned. Then the march is made, at some time when the crops will permit it, with the regular forces and such National Guard organizations as will volunteer. This idea, it will be seen, presupposes a winter's work before the actual march takes place; a winter of study and thought, during which there would be an officers' meeting every week or alternate week, to discuss the practical military questions arising out of such an affair, and which meetings would be attended by the brightest of the National Guard officers, as well as by the regulars. Can there be any doubt but that at the end of that time both would have been substantially benefitted? Yet if any officer desires to undertake anything of the kind, all he has to do is to go and do it, as Capt. Dillenback took his battery to the Peekskill Camp. There can be no doubt that he will receive the earnest coöperation of the National Guard and particularly of its younger officers.

One of the best things that could be established, where troops are stationed near a large city, as on Governor's Island, would be a skeleton camp, to be held in the Saturday afternoons or in the evenings, at which guard mountings and other cere-

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monies might be practiced, and theoretical, combined with practical instruction, be given to such National Guard officers as would attend it.

Another matter which could be introduced without any legislation, and which would be of the greatest practical value, would be for the army authorities to prescribe a system of examination in different portions of the country, by which any officer or non-commissioned officer of the National Guard could present himself to designated boards and if he passed the prescribed examination, receive a certificate of his qualifications, and have his name entered upon the army list as Passed Captain, (First Lieutenant, etc.) U. S. A., such certificates to hold good for three or five years, at which time a further examination would be required. In prescribing such a system it would be necessary to designate the points upon which examinations would be required, *i. e.*, such a portion of the Drill Book and such portions of other standard works as contain the necessary information for the different positions. The examination should be thoroughly practical and directed more towards the matters which will be necessary to be known in service than to fine points in drill. This system has been pursued for a number of years in Great Britain and with the most satisfactory results. The Boards which acts there are, I believe, those whose duty it is to examine the army officers, and the questions which are submitted to the applicants are such as I doubt if 5 per cent. of the National Guard officers and a very large percentage of regulars could answer correctly. Yet the number of British volunteer officers who present themselves at these examinations and receive their certificates, simply to have their names appear in the Army Register, and have the honor of signing Passed Captain, etc., is very large.

Among other valuable innovations General Ordway has introduced into the District of Columbia N. G. has been the putting of this system in practical operation. Any of its members can present himself to an official board for examination for any rank and if he passes is thereafter styled "Candidate for promotion" and "Candidate for ———" is prefixed to his name in all rolls and returns. Nearly a hundred out of his small brigade have availed themselves of the privilege. The practical results have been to greatly elevate the military tone of the command and to provide first class material for officers.

There can be no doubt that if the Army Examining Boards were to be authorized to act as General Ordway has provided for those of his brigade, a very large number of the energetic young officers and non-commissioned officers of the National Guard in the different parts of the country would fit themselves to pass such an examination before them, solely for the prestige which it would give them among their fellows.

One of the difficulties connected with the National Guard service to-day is the inability of any one practically to demonstrate his fitness for the position for which he is a candidate. While, therefore, in most States, and particularly in the State of New York, there are rigorous examining boards, and no person is permitted to obtain a warrant, not to mention a commission, unless he is passed by them, yet, on the other hand, the examination does not take place until the appointment or election is made. It is consequently a question, not of how much a man knows, but whether he knows so little that he should not be allowed to retain the appointment he has already received,—a great practical difference. If boards of this kind should be established, there would be very many who would gladly avail themselves of them, for the purpose of practically demonstrating in advance that they are competent and more than competent for the positions for which they are candidates.

There are also many National Guardsmen, who, while prevented by their business occupations from giving but limited time to the matter, are eager students of military matters. To have a course prescribed which they could take up and follow, on the

Chautauqua method, submitting subsequently to an examination upon the subject, would be to them a great satisfaction, and would very much improve their military efficiency.

In this connection it may be asked, why cannot the discussions which take place at the officers' lyceums of the different posts be thrown open to the National Guard? They would esteem it as a compliment, and while the officers lecturing would be pleased to have their papers listened to by a larger audience than their immediate comrades, and by one which would be intelligent and appreciative, the effect of the papers, and the subsequent discussions by men who approached the subject from a civilian, as well as from a military standpoint, would be interesting and instructive to all concerned. A small fee would be paid with pleasure by these outsiders which could be used to provide the military publications and library which these lyceums now need so greatly.

I mention a few of the ideas which have occurred to me, which seem to afford a plain and practical way by which those desiring to improve the military service of the country can do so if they desire. Many others can be thought of. The position of military writers and military commanders in regard to this subject is that of the old wagoner in the fable, praying to Heaven to lift his wagon out of the mud, when what was wanted was for him to put his shoulder to the wheel, himself, and shove. If the commander of any post within ten miles of a city in which there is a National Guard regiment will undertake to *shove* this matter in the directions above mentioned or in any similar direction, it will produce surprising results.

II.

"Is the Three Battalion Organization Necessary for Us?"

Captain Arthur L. Wagner, Sixth U. S. Infantry.

THE discussion of Captain Edmunds' paper by Colonel Hawkins and Lieutenants Bush, Evans and Stuart, has been so complete that I fear that further comments may seem supererogatory; but the captain's rejoinder to Lieutenant Bush's excellent argument contains some statements whose historical correctness may well be challenged, and some opinions which may well be disputed.

Captain Edmunds, it seems, acknowledges the general correctness of Lieutenant Bush's arguments, and does not undertake to reply to them further than by saying that the proposed organization, while adapted to the military conditions of Europe, is not suited to our own. "We are," he says, "a nation by ourselves, under peculiar conditions; let us respect these conditions." Now, what are these peculiar conditions that we should reject the tactical experience of all European nations? Our soldiers use the rifle, they march, they must be fed and clothed, they must be supplied with ammunition, they are made of flesh and blood, and they are subject to the same moral influences as troops on European battle-fields. Our *terrain* is different in many respects from that of Europe, but the essentials of a defensive position are the same in Pennsylvania, Kansas, and California as in Alsace, Bohemia, and Bulgaria; and the manner of attacking or defending it cannot vary in any great or important degree. Indeed, the tactical formations in universal use in Europe, and to the adoption of which by us the three battalion organization is a necessary step, had their germ in the tactical formations of our great war. They now come back to us elaborated and perfected, but thoroughly adapted to the military genius of the nation from which they sprung.

At no time, in fact, has there ever been such a difference in American and European methods of war as to justify us in discarding the tactical experience of European nations. Nor have we ever done so. The "German system"—or, more properly, the system of Frederick the Great—was not, as Captain Edmunds would have us believe, adopted purely by accident due to the presence of Baron Steuben with the

Revolutionary army, but simply because that system had been adopted by all military nations as thoroughly as the Prussian system of a later date has been adopted in its essential features by almost every nation of sufficient military importance to possess an army. If our inspector general at that period had been a Frenchman or a Russian, instead of a German, the system adopted would have been essentially the same. To this system we added the use of skirmishers, but we still used the old linear formation that had been used in the formation that had been used in the Seven Years' War. That this use of skirmishers was not a mere outgrowth of our peculiar conditions—either physical, moral, geographical, or topographical—was demonstrated by its adoption and development by the French and its eventual use by all European armies during the Napoleonic wars. In the war of 1812 the tactics of our armies—except those raw forces which were unable to manœuvre and could only be used on a purely tactical defensive—did not differ in any appreciable degree from the system in use on the other side of the Atlantic. In the Mexican War, our organization and tactics were almost identical with those of European armies; and Hardee's "tactics" with which we began the Civil War was almost an exact copy from the French drill. This system failed, it is true, and a new attack formation and an enormous development of the use of skirmishers grew out of the demands of necessity. So did the Prussian system fail in 1886 and 1870–71, with practically the same result in the adoption of the systematic use of great numbers of skirmishers; and the present universal tactical system is simply the result of our experience plus the experience of European armies.

According to Captain Edmunds, Lieutenant Bush's opinion "contains the advanced theoretical ideas on organization and tactics which prevail among the leading military nations of Europe, and which ideas it is sought to apply to our army and to our people in preparing them for war, while losing sight of the most important fact that the conditions which prevail with us are radically different in whole and in part, in principle and in detail, from those found among nations which it is proposed to imitate." I contend that there is no "important fact" lost sight of at all in the application of the theories enunciated by Lieutenant Bush to our own conditions. These ideas are applicable to *good troops* anywhere; and it is to well-trained, well-disciplined troops that our success has been almost altogether due in the past, and upon whom we must depend in the future. Captain Edmunds has underrated the military proficiency of American troops in past wars, especially that of the Revolutionary army. He says, for instance, that during the whole War of the Revolution the Americans but twice used the bayonet "to any extent," namely, at Eutaw Springs and Stony Point. It is not clear to what degree the expression "to any extent" is to be allowed to modify this statement. Certainly he seems to have forgotten the magnificent action of the Maryland trops under Colonel Howard at the Cowpens, the charge of the troops under DeKalb at Camden, and the storming column under Alexander Hamilton at Yorktown. In the light of these actions, there is no justification for the statement that "shock action was not their forte and they could not be expected to so engage the highly disciplined and seasoned British troops." In point of fact, the Continental troops—not including, of course, the hordes of militia mainly noted for showing their heels to the enemy at every opportunity—were as highly disciplined and war seasoned as any troops in the British army were. It was these troops, patiently trained and perfected by long service, who won American independence. There is no excuse whatever for even a hint that American troops have in any war shown that shock action was not their forte. The conduct of Leavenworth's and McNeil's battalions at Chippewa, Miller's magnificent action at Lundy's Lane, the charge of Riley's brigade at Contreras, the achievements of Worth at Molino del Rey, the famous charge of Pickett at Gettysburgh, Hancock's assault at the "Bloody Angle"—probably the only action in the last half century of

which it could be said that most of the dead were killed with the bayonet—all refute such a statement. These battles were, of course, fought with seasoned troops. Raw troops produce a Detroit surrender or a Bull Run stampede.

Captain Edmunds says: "I can hardly believe that the eminent authorities quoted by Lieutenant Bush would have contended for the three battalion organization without the proviso attached that the regiment should consist of at least 1200 men." These eminent authorities probably *did* suppose that the regiments would have a war strength of 1200 men. Such men as Sherman, Sheridan, McClellan and Upton would not have advocated any system that they did not believe practicable, and *they* did not discover any impracticable features in the three-battalion organization. There is nothing in the Manderson bill to show that a war strength of the given number is not contemplated, but much to show that it is. Moreover, there is no reason why this strength could not be approximately maintained during the campaign. It does not follow that because a vicious system of recruitment obtained during the War of Secession, we cannot and will not do any better in future wars. Probably no feature of our military mismanagement has been dwelt upon so strongly and discussed so cogently by our best generals as the manner in which our veteran regiments were allowed to dwindle away in the course of a campaign. To suppose that this would not be remedied in another war, is to suppose that the American people do not remember anything, or else that they never learn anything from their own experience. Captain Edmunds thinks that, if an emergency should suddenly demand an increase in the strength of our regiments, "we should still be in sorry straits, because our extended order movements require much preparation and cannot be acquired in a day or a month." The captain is undoubtedly correct. In future we shall have, more than ever before, to deplore our lack of preparation. But we must simply "face the music" and get ready as soon as we can. If we have not good troops with which to begin the war, we must defer our hopes of success until our armed men become soldiers in fact as well as in name. We can't mend matters by hurrying poor troops into the field only to have them promptly defeated. We should remember that the war which began in April, 1861, could not be prosecuted with vigor until the spring of the following year. The use of arms of precision renders the preparation of troops for efficient service a matter of much more labor and much longer time than was formerly the case; but would anybody urge for this reason that we should return to the use of the old musket and "buck-and-ball" cartridge with which a man who could hit a "flock of barns" at two hundred yards was as good as a sharpshooter? Yet, would it be more absurd to advocate a return to antiquated fire-arms because their use could be learned in "a day or a month," than to plead for the retention of an obsolete organization because more training would be required for a system that would be of some use?

At the close of Captain Edmunds' paper occurs this remarkable passage: "If a war comes, which let us hope it may not, we must rely rather on our enthusiasm, patriotism and valor to carry us through than on perfect organization. These qualities have never failed us." This would do very well as a peroration for a member of Congress appealing to the patriotism and parsimony of a backwoods constituency, but the words have a strange sound when used by an educated soldier. We may never have been lacking in these qualities, but how did they "carry us through" at Detroit or the Heights of Queenstown? Were the troops at Bladensburg lacking in these qualities when they were defeated by a much smaller but better organized and disciplined British army? Were the volunteers of 1861 deficient in these qualities at Bull Run? Have American troops, dependent solely upon enthusiasm, patriotism and valor, ever decided a war in our favor; and has it not always been found necessary to supplement these

valuable qualities with discipline, good organization, and military training before the serious work of war could be accomplished? If enthusiasm, patriotism and valor be such all-sufficient qualities, why did the enormous army in Paris surrender to half its numbers of disciplined Germans? Were Bourbaki's men on the Lisaine less enthusiastic, patriotic and valorous than the men in the smaller army of Von Werder? Has the time ever been when enthusiasm, patriotism and valor were not to be found in French soldiers? Was it due to a lack of enthusiasm, patriotism and valor that the Mahdi's men left a single Englishman alive in the Soudan? If enthusiasm, patriotism and valor cannot enable Frenchmen or Arabs to overcome inferior numbers of better trained and better organized enemies, what right have we to claim that these qualities could give us victory over inferior numbers of hostile troops better trained and better organized than ourselves? Finally, if it be merely a question of patriotism, enthusiasm and valor, rather than perfect organization, what is the use of all this objection to the three-battalion organization? Even if it were a very defective organization, should we not still have enthusiasm, patriotism and valor left? Or would these admirable qualities vanish from the hearts of our soldiers as soon as we changed the number of battalions in our regiments?

Captain Edmunds would have us adopt "a system of tactics suited to the magazine gun and our national reputation as marksmen." As to the use of the magazine gun, I contend that there is nothing in the three-battalion organization, nor in the tactics naturally growing out of it, that is in any way opposed to the use of the magazine rifle with the fullest effect. As to "our national reputation as marksmen," let us consider our present condition rather than our past characteristics. We are no longer a nation of backwoodsmen, inured to hardship and habituated to the daily use of the rifle. Our people are composed of peaceable farmers, merchants and mechanics, and our conditions are in this respect like those of Europe more than they ever were before. But, after all, in what conceivable manner can the three-battalion organization be opposed to "our national reputation as marksmen"?

Senator Manderson has called attention to the fact that of all the nations possessing armies, the only ones retaining the ten company, one-battalion, organization for their infantry regiments are Persia, China and the United States. Possibly, if the three-battalion organization were proposed for the infantry of the Celestial Empire, some worthy mandarin, true to Chinese traditions, might say: "We are a nation by ourselves, under peculiar conditions; let us respect these conditions." This would be truly Mongolian, but it would not be "war."

III.

"The Art of Subsisting Armies in War."

Captain Henry G. Sharpe, Subsistence Dep't U. S. A.

THE object for which "The Art of Subsisting Armies in War" was compiled and published is, I believe, clearly stated in the preface; and I have also stated therein my consciousness of the imperfections and incompleteness of the book; I therefore, have no reason to object to any fair and intelligent criticism, even if adverse, but rather welcome the same, as it attracts attention to the subject and may thus lead to the establishment of a Staff School, the sole aim and object of my book.

Captain Chester complains that the picture presented in the historical part is incomplete,—which is exactly what he might have learned from the preface,—and also that the effect was to produce a popular rather than a scientific discusion of the Art. Captain Chester's ideas as to a proper introduction to the subject are evidently at vari-

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ance with those of Generals Pierron and Lewal and with Intendant-Général Baratier; and it would be interesting to know what he would consider a proper introduction.

On page 296, tome II, "Études de Guerre, Tactique des Ravitaillements," General Lewal states that road locomotives were used by the Russians, during the winter, in the war of 1877–78 in Bulgaria; he also states that they were in use in the Italian army, that the Germans made use of them in 1870; and adds that it is probable they will play an important rôle in an army. M. X. de Boysson, Contrôleur de l'Administration de l'armée, published an article in the *Revue du Service de l'Intendance Militaire* in 1888 on the subject of road locomotives, and speaks highly of the advantages of using them in an army. As it seems to be essential to level everything up to our last war, it is but right to add, in extenuation for these distinguished officers, that they were not in our last war and so do not remember "the condition of the Virginia roads from 1861 to 1865."

The critic evidently desires to make it appear that I have condemned the system by which our armies were supplied from 1861 to 1865. I am justly proud of the grand achievements of the Subsistence Department during that great war, and am of the opinion that no other system than the one then in vogue could have been successfully employed, and that that system must be employed in any future emergency. I am opposed to the post-mess system, and I believe the Buffalo incident is an evidence of the viciousness of such a system. The facts are that the State troops had been subsisted when in camp at a general, or post, mess; none of the officers had any responsibility, save to make proper return of the number of men present; the contractor employed his own cooks, etc., and the men received no instruction in cooking; the regiments were suddenly ordered into active service, and were to be subsisted as if in an enemy's country; and as neither officers nor men (through no fault of theirs) knew what to do, of course the suffering was great.

What was the cause? Surely the adoption of the general mess, which thereby prevented the officers and men from acquiring any knowledge of the system that would be used in the field.

Captain Chester states:—"The post-mess is only a conglomeration of squad messes; and squad messes are the field messes of the future." In other words, messing in the field will be by squads, which is just where the great advantage of the company mess system is evident. M. Émile Zola's novel, entitled "La Débâcle," has attracted a deal amount of comment in France, and while General Morel says that it is chiefly on account of "*les vicissitudes du ventre*," it is for that very reason an excellent book for the consideration of those who advocate the adoption of the post-mess as a "system that at least relieves the company commander and first sergeant of one burden," and which might, perhaps, provide also a rest cure and nurses for those overwrought individuals.

Colonel J. C. Baily, Asst. Surgeon General, U. S. A., Medical Director Department of Texas, in his annual report says: "The post-mess house will long remain a monument to the folly of initiating army reform elsewhere than at the camp-fire. When the soldier is educated to the magazine gun, and the destructive equivalent of the company is that of the present regiment, more than ever will it be necessary to foster the self-dependence of the company and the interdependence of its members."

Unfortunately no one has written a full account of the transactions of the Subsistence Department during our last war. Realizing the impossibility of writting such an account without having access to the official records I did not attempt it. On page 222 I state the reasons why the system of subsisting our armies in that war was not described, and in view of such explanation I contend, the criticism that honorable mention is barely accorded to American experience, is unfair.

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Captain Chester complains that he finds nothing new in the book; and later that he has found a "novel" idea (on page 26), and ascribes to me the honor and distinction of having invented the General of Communications and his duties. The idea is said to be "capital," but "impracticable"; "and two commanders in the same theatre of operations an impossibility."

Attention is invited to the following:—1. Major F. C. H. Clarke on page 52 of his "Lectures on Staff Duties" says: "All these multifarious requirements cannot evidently be looked after by the general officer commanding the troops in the field, but must be committed to the charge of an experienced officer, subordinate to the General-in-Chief and his Chief of the Staff, called the General of Communications, with a sufficient staff of officers and clerks for his assistance."

2. "The Soldier's Pocket-Book for Field Service," by General Viscount Wolseley, 5th edition, page 150, defines the duties of the General of Communications very much in the same terms as laid down in the British Army Regulations, which further provides that: "The authority of the General of Communications is paramount over all troops halted on or moving over the Line of Communications, and over all officers of every department of the army employed on that line."

3. On page 323, tome I, "Stratégie et Grande Tactique," par le Général Pierron, we find the following: "Dans le cas d'une guerre européenne l'organization du service des étapes, qui a pour but essential le ravitaillement continu de l'armée d'operations en hommes, en munition et en vivres, ainsi que l'évacuation de ses non-valeurs et de ses prises, doit être basée sur les principes suivants:—1. Conférer à une autorité unique (inspecteur ou directeur général des étapes et des chemins de fer, bref á un *général des communications*), le pouvoir suprême sur l'usage des voies ferrées, si les chemins de fer qui servent à l'armée ont, sur leur parcours, une section commune." (The italics are the author's.)

On page 333, same volume, is an extract from the Instruction or Ordinance of the King of Prussia, dated July 20, 1872, which provides for the appointment of an Inspector-General of étapes and railways and defines his duties.

4. On page 237 *et seq.* of Vol. II of "The duties of the General-Staff" by Major-General Bronsart von Schellendorf, the duties of the Inspector-General of Communications and Railways are outlined.

5. Baron Von Der Goltz in his "Nation in Arms" refers to these duties on page 377.

6. On page 156 *et seq.* of "L'art de ravitailler les grandes armées," par M. A. Baratier, Sous-intendant militaire, these duties are described in detail.

7. On page 208 of his "Report of the British Naval and Military Operations in Egypt, in 1882," Lieut-Commander Goodrich, U. S. N., in describing the Lines of Communication says:—"The Base and Lines of Communication during the late campaign in Egypt were commanded by Major-General W. Earle, C. S. I., and no officer in the expedition was more unremittingly occupied or had greater difficulties to contend against."

8. "The Précis of Modern Tactics," by Major Robert Home, R. E., contains a description of the organization of the German line of communications and on page 194 it is stated:—"The service working in rear must therefore have a special and separate organization. In Germany (France and Austria have followed the German arrangements to a great extent) there is an officer who commands the whole line of communications." On page 103, same work, we read:—"Nothing more clearly demonstrates the value and importance of a careful preparation of these details than the Franco-German War. Prussia conquered France, not so much from valor on the field of battle, as by the most painstaking care in every particular." And again on page 194, same

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work :—" Looking to the recent campaigns of 1866 and of 1870, it appears that in this organization the Prussians showed their superiority more than in anything else," etc.

The distinguished and erudite members of the International Conferences which have discussed the matter of requisitions, and the able authors, civilians and soldiers, who have written many voluminous works on that topic, will, no doubt, be relieved to learn that Captain Chester has solved the entire problem in a word, "necessity": and "there is nothing more to be said."

Captain Chester's offer to act as sponsor for the book is appreciated; but I think some one familiar with the sources from which it originated should stand in that position; as such an one would probably feel assured that there was no likelihood it would develop to be "novel," "impracticable," or "an impossibility."

IV.

"The Twelfth Regiment of Infantry."

Francis Wister, late Capt. 12th U. S. Inf. and Bvt. Lt.-Col. U. S. A.

I HAVE read with interest the Historical Sketch of the Twelfth Regiment Infantry, published in your JOURNAL of September, 1893. I know but little of the history of the regiment after the War of the Rebellion, but I can claim some knowledge of the services it rendered during that period.

My criticism of the History, if such it may be called, is rather of the omissions of the sketch than of the narrative as published. It certainly is not, as it stands, a history of the Twelfth United States Infantry.* I cannot think that any surviving officer, or enlisted man, who was identified with the Twelfth Infantry during the War of the Rebellion could be satisfied with the omission of such names as Sergeant, Henry E. Smith, Hulings, Eggemeyer, Tracey, Lamonian, Duvillard, VanRensselaer, Egbert, Heckscher, and doubtless others that I do not recall.

Sergeant died of wounds received in action while commanding a regiment of volunteers; Hulings was killed at Spottsylvania; Tracey died in New York after a short illness directly due to exposure in the field; VanRensselaer served honorably on General Sykes' staff.

Winthrop's name appears several times, but his death is not mentioned. He was killed in action while commanding a brigade. A score or more of officers were wounded in the many actions in which the command was engaged, and valuable service was rendered by many while serving with the volunteers.

No mention, whatever, is made of the enlisted men who were promoted to lieutenancies for gallantry and good conduct, while some of them attained distinction as officers. Lamonian, Thieman, Wagner, Eggemeyer, and Allen were among these. Urmston was killed while in command of the regiment during the campaign of the Wilderness.

Many of the non-commissioned officers were unfitted for promotion, but won fame and reputation in the positions they occupied. Meeks, Donnelly, Cochran, Long, Golding, Bowen, and Neff were conspicuous. The regiment rendered valuable service in stopping the rout of the Eleventh Corps at Chancellorsville, to which Mr. Abbot has merely alluded.

I have not undertaken to give a full list of the names of the officers and men who served with distinction, and I have omitted many that were named in Mr. Abbot's

* These historical sketches do not claim to be full histories. There is not a regiment in service whose full history could be compressed into the twelve pages of this JOURNAL allowed to each sketch or even into the largely increased space which some of them occupy.—*Editors Hist. Sketches.*

paper who are entitled to all the praise he has awarded them. It happens that the records of the Twelfth Infantry on file at the War Department are very complete, and in the "Rebellion Records" many of our officers are favorably mentioned by regimental, brigade, and division commanders.

V.

"Small-Arms Firing."

Lieut. W. H. Johnston, Jr., 16th U. S. Infantry.

WHILE most of Lieutenant Muir's strictures upon our methods of instruction in small-arms firing are merited, he suggests a few innovations the propriety of which I think doubtful.

His personal success may have demonstrated to him the advantages of a peep sight, but it is by no means the experience of many with whom I have been associated in company practice and competitions, that greater accuracy follows the use of such a form of rear sight. This aperture being wider than the notch of the open sight, a straight line of sight can be held only with greater difficulty, or more perfect eye-sight, and the shots show a greater horizontal deviation. As to vertical deviations, due to irregular front sight taken, it is certainly no easier to hold the top of the front sight in the centre of the peep than on a line with the top of the open sight (what is technically called a "half sight").

Even advocates of the peep sight for known distance firing discard it while skirmishing, the more real and necessary kind of practice. The advisability of using the same sight always, certainly needs no assertion. The presence on the rear sight leaf of two apertures, each with its indicator, leads to confusion while adjusting the sight hurriedly, as it would necessarily be adjusted in action.

Even though our men be drilled to use the peep sight at target practice, they will naturally use in action the open sight, as at skirmish, for it permits a more prompt aim. Setting, through habit, the arrow of the peep opposite the designated range, the open sight through which they will quickly aim will then be too high by about a hundred yards; and the common tendency to fire high in action will be intensified. It is certainly to be hoped that the new rifle may have but one kind of rear sight notch, and that an open one, even narrower than the present one; if possible, a V-shaped aperture, just deep enough to bring the top of the front sight to the top of the notch when a full sight is taken. This might well be placed at the small of the stock for greater accuracy, and have the present excellent wind-gauge and automatic drift correction. It should be attached to the gun only when firing at targets. For drill and for action a simpler sight, permanently attached to the piece just in front of the breech, should be used.

This sight should have no wind-gauge, no drift correction, no peep. It should have one open notch permanently vertical for its point-blank range, or the extent of its dangerous zone (with the new rifle, five hundred yards, I hear). A second leaf might fall toward the breech when out of use, and be of sufficient length to be of use in controlled volley firing at all ranges from five to eight hundred yards. This might be called the mid-range leaf. A third leaf might fall towards the muzzle when out of use, and be high enough when vertical for volley firing from eight to twelve hundred yards, the limit advised in action.

While sharpshooters would carry the target sight habitually, and others would use it in action when time and cover permitted deliberate aim,—especially on the defense over ground previously measured,—infantry generally should go into action at the limit of their fire without the target sight but with both these service leaves raised, firing

volleys to the latest. As mid ranges are reached (800 to 500 yds.) the long leaf might be pushed down and aim taken over the mid leaf, this in turn being lowered when the weapon's point blank range is reached.

With the flat trajectories now obtained, such firing would be sufficiently accurate for volley firing, individual errors in aim contributing towards an increase of the beaten zone's dimensions, just as the use of two or three elevations for one range is supposed to do. It would be more accurate than with the present sight leaf, which under excitement is now frequently left throughout an extended order drill at the elevation with which the drill was commenced, and which would rarely be set with accuracy, if set at all, in action.

Apropos of sights, why has the carbine a blunt and the rifle a sharp front sight? The sight cover may be retained permanently on the former, while it must be removed from the latter each time the bayonet is fixed, and consequently cannot be worn at drills and ceremonies. The designers of our new rifle should find a better method of attaching the bayonet than the present, by which the same metallic part does duty alternately as front sight and bayonet stud. For the safety of the front sight it should have a permanent cover attached to the barrel. The bayonet could fit over the muzzle in front of this cover, and should lie below the axis of the bore, not at the side as now. The carbine sight cover being permanent, a front sight like the present sharp rifle sights could be used.

I believe all officers agree with Lieutenant Muir that our efficiency is not increased by the device of a figure of merit. If preliminary and additional firing and sighting shot was forbidden, and each shot scored, a fairer relative classification would result. There is no reason why target practice and drill should not be instructed, reported and inspected in the same manner.

The suggestion that department inspectors of small-arms practice report the relative proficiency of companies, posts, etc., while by no means new, is excellent. But it is difficult to discover in the adoption of this method any reason for Lieut. Muir's deduction that practice throughout the year would necessarily follow.

The target seasons for posts are not now uniform throughout each department. They might be so arranged that the posts would conclude practice successively at intervals of one week. The inspector's arrival at each post might then follow closely upon its season of practice, and a week's inspection should enable him to record and report the relative proficiency of the organizations there stationed.

Lieutenant Muir may not remember, or may not have experienced, the pleasure (?) with which we practised in winter months before Blunt's first manual (1885, I think) reduced the season to four months. Even in Texas I have had fires on the range to thaw out benumbed fingers, so that the men could crowd into each month its requisite practice. My hands have been cramped tightly upon book and pencil, scoring zeros with dismal frequency in a Texas norther. Does any one believe more interest was taken than now, by officers or men? Or, that any greater proficiency would result from firing daily, rain or shine, freeze or melt?

In the old days it was only with difficulty our best shots could be induced to attend the annual competitions. Since the season has been reduced to two months, and our attention thus concentrated upon this one feature of a soldier's training, men of each company struggle throughout the season for a record which will justify their selection as competitors. We may have fewer marksmen than when a whole year's practice and limitless ammunition were used to qualify poor shots, but we shoot far better than we did then. Better and better records are made each year by competitors, and greater interest is taken each year by all men.

I believe not only target practice, but all the other kinds of our training, should be

limited to short seasons during the year. These seasons for each post should be prescribed by its commanding officer.

Let us assume that May and June present the most favorable conditions for target-practice. April should then be devoted to position and aiming drills and estimation of distances. Gallery practice is a waste of time and ammunition. July should find us prepared for moving targets, shelter trench fire, and firing volleys over strange ground with the service sight described above, over ranges utterly unknown, and at targets representing infantry, cavalry and artillery, distant from five to twelve hundred yards. In August, drills should be two hours daily, in company and battalion extended order, with the expenditure of as much blank ammunition as the honorable second comptroller could stand.

September should take us into outpost, grand guard, advance and rear guard, constructions of field works, reconnaissance and minor tactics. Through October and November, two hours daily in close order squad, company, battalion and regimental drills.

During December, January and February, no drill at all, except five minutes setting up drill before each meal. If the post has a gymnasium, the companies should each spend two hours therein weekly. If not, the same time should be devoted to walking, running, jumping fences and ditches, climbing walls, etc.

March should find us again at close order drills, or in bad weather at the manual of arms indoors.

Who will contend that a soldier thus systematically trained will not out-shoot, out drill and, what is equally important, out-march the man who tries to shoot, drill and do everything else throughout the year!

Lieutenant Muir, with his usual good taste, refrains from falling into the hackneyed criticism of officers who enter competitions beside their men. But as so many officers who never themselves shoot, or care to do so, have been scandalized by this intimate association of officers and men, I should like to emphasize Captain Blunt's excellent statement, quoted in this article, that company officers should become proficient, not only theoretically but practically. How can they become more so than by personal participation in a competition and by the consequent association with the best shots of other regiments, commissioned or otherwise?

Enlisted men more readily accept advice on the range from an officer who has demonstrated his ability to shoot in the crucial test of a competition, than from one who has only a book knowledge of the art. And reasonably so. One who has shot much becomes familiar with the sensations, the errors and tendencies of a rifleman; and can better prescribe for his unsteady trigger pull, faulty position, loss of control of the eyelids, or shaky nerves.

All the innovations which have crept into general use in our practice, are the results of experiments made by intelligent competitors, many of them officers. Among these may be mentioned the many gunsling positions for accurate or rapid shooting, methods of loading and firing rapidly, the jack knife position at three hundred yards, the body rest at two hundred, the use of resin on the hands and gun, of camphor, black or white paint on the sights, chewing gum to quiet the nerves and other similar practices. These may be ridiculed by those who proudly boast that they "never shoot," but they perfect the soldier as a target shot, which is the goal of our ambition in peace.

A comradeship exists between all who enter these competitions and thus enjoy a "shooting acquaintance," but no undue familiarity between officers and men follows. The same dandies who are horrified when officers and men lie side by side to fire at a target, would not hesitate to hunt game in company with the same enlisted men. No argument can better attest the general excellence of our present regulations, than the wonderful advances made by our troops since these regulations were adopted.

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VI.

"Field-Works in Military Operations."

United Service Gazette, (London) Nov. 18, 1893.

THE range and accuracy of the modern breech-loading rifle give increased interest to the consideration of the value attaching to field-works on the battle-field and in positions where an action is likely to take place. In fact, the proper and intelligent use of such works has become one of the chief elements for the successful prosecution of a campaign, offensive or defensive. In an able paper appearing in the current number of the JOURNAL of the Military Service Institution, First Lieut. A. L. Parmerter, 21st United States Infantry, adduces instructive examples from the time of the American Civil War of 1861-65 to the Russo-Turkish war of 1877-78, showing the great development in the use of earth-works in the field, in which term he includes the various kinds of artificial shelter constructed and utilized by troops as a protection from hostile fire. The whole article may be read with advantage, but we have only space to touch on a few points.

The first cause that led to the extensive use of such works during the American Civil War was, as we might have expected, to guard against surprise. This was necessary on account of the thickly wooded nature of the country, which prevented a careful watch on the enemy's movements. But the value of such works in strengthening a position was soon appreciated by both sides. The character of the works gradually changed from hastily constructed rifle pits to continuous lines of shelter trenches of considerable strength as officers and men came to understand their advantage.

After a detailed consideration of the operations during this war, Lieut. Parmerter submits the following conclusions, which would seem beyond cavil—that the close nature of the country rendered field-works necessary to guard against surprise; that positions so strengthened were almost impregnable against direct assault, unless the attack was made with overwhelming numbers or against troops greatly demoralized, and that when such assaults were made they were always attended with heavy losses; that a front attack could be carried out successfully if combined with a simultaneous flank attack; that a superior army could resort to a turning movement to compel an enemy to abandon such a position by leaving a force intrenched in front of the enemy and sending a sufficiently large one to turn the position; and lastly, that field-works so strengthened a position that one man in the works was equal to three or four in the attack.

It is worthy of note, as supporting this last contention, that the result of numerous attacks made on the field-works around Richmond, U. S. A., led General Wright to say that "a simple trench, defended by two ranks of infantry, covered by abattis or other obstacles, and placed on a site which permits the range of the new arm to be utilized, is absolutely impregnable except by surprise." This is perhaps a little too strongly stated, but none the less conveys an important truth.

A curious question, and one we confess it is difficult to answer, is raised by Lieut. Parmerter—that is, whether, as he believes, the campaign of 1870-71 might not have resulted very differently for France had the lessons of the American Civil War been more fully learned. Both sides, he claims with much justification, could have obtained knowledge that should have materially modified their methods, especially at the beginning of the campaign.

The mode of operation adopted by Johnston in his defensive campaign in Georgia would, when the nature of the country permitted, certainly seem to be the proper one for a state to resort to in order to gain time to develop its resources. As it took Sherman more than two months to force Johnston back one hundred miles, there would

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seem to be every reason why, at the beginning of the Franco-Prussian war, some such method as this should, as Lieut. Parmerter thinks, have been resorted to by France when she found her adversary so much better prepared for war than herself.

In this war artillery was, as we all know, much more extensively used in preparing the attack, but the conclusions arrived at from the operations of the American Civil War are fully substantiated. There were, as pointed out in the gallant officer's paper, numerous instances where direct attacks on positions, even weakly intrenched, failed, and if finally successful were generally so after a flank had been turned. When a direct attack did succeed, it was due to the fact that, either the ground in front of the position was so broken as to allow the attacking force to approach within a short distance unexposed to fire, or the defenders were greatly demoralized by being poorly covered from the preparatory artillery fire of the attack. The Germans' superiority in numbers allowed them to make use of a turning movement in conjunction with the frontal attack. This front attack was made strong enough to hold the enemy in position and prevent him from detaching troops to oppose the turning movement.

In the Russo-Turkish war field-works were used to a greater extent than in any of those previously considered, and from the examples given by Lieut. Parmerter of incidents during that campaign, it seems safe to conclude with him that, although we cannot assume that a position strengthened by field-works is impregnable to direct assault, even without an artillery preparation, still such an assault would be so hazardous and so costly in men that it had better be avoided if possible. The study of the right use of field-works is to our mind one of the most important to which an officer can direct his attention, for of field-works the Archduke Charles has said: "Like any weapon, they lose their value when badly used, that is to say, when constructed without an object, without intelligence, and defended without bravery."

The question of a light intrenching tool to be carried by the soldier on his person seems to have received no perfectly satisfactory solution in America or, we would say, elsewhere. Our readers will remember that a very ingenious "rifle trenching-tool," the invention of M. Léon de Layen, and described by us at the time, was exhibited a few months ago at the headquarters of the Honorable Artillery Company. But though the invention met with high commendation from the numerous officers present, many of whom declared that their experience in the field convinced them that M. de Layen's trenching-tool would be of very great service to an army, as it provides a ready means to each man of sheltering himself from the fire of the enemy, and enabling him to return that fire without having necessarily to remove the tool, we do not hear that it is any nearer being introduced into the service.

There can be no doubt but that an important consideration is the moral effect likely to be caused by field-works on the troops occupying them. Hesitancy in advancing to the attack is certainly a probable result. We must acknowledge with General Sherman that when a line of battle is once covered by a good parapet, made by the engineers or by the labor of the men themselves, it does require an effort to make them leave it in the face of danger. The difficulty, however, of getting troops to leave cover can, as Lieut. Parmerter rightly observes, be reduced to a minimum by perfecting discipline. Numerous in our own army have been the examples of great achievements mainly effected through the existence of good discipline, but here we have an extra incentive to maintain it to the utmost, for assuredly in future wars field-works will be extensively used.

Reprints and Translations.*

THE FUNDAMENTAL PRINCIPLES UNDERLYING THE BATTLE TACTICS OF THE DIFFERENT ARMS.

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IT is of the utmost importance in every line of study to understand what is meant by the use of special words. Consequently I must ask you to fully understand the meaning I attach to the word "Tactics." By it I mean *methods adopted for carrying out* anything. Hence by the expression "Battle Tactics" I mean "the methods adopted for carrying out a battle."

My object this evening is to bring to your notice the fundamental principles which underlie the methods adopted for carrying out a modern battle. The importance of such a study cannot be over-rated. If we understand and thoroughly grasp the principles of a subject then the details for the putting of those principles into practice will almost naturally suggest themselves to those whose duty it is to carry them out. The study of the various details that are or have been adopted is undoubtedly of great value as it makes a man ready to meet any sudden emergency that may arise, but nothing can be more likely to produce dullness of mind and even disaster than a mere study of details without a concurrent or even previous study of the principles underlying them and which even suggested their use.

THE ROLE OF THE BATTLE IN WAR.

The battle is the keystone of the arch of war. It is the great drama of life and death, of victory or defeat for which all else in the military career and profession is but a preparation. On it hangs the fate of nations. A bad strategy (*i. e.*, a bad conception of the operations undertaken to carry out the war) may be redeemed by victorious battles, but the very best strategy is of no avail when the battles it leads up to are lost. The very idea of war and of the military preparations for it involve the idea of battle, and hence the battle must be the one thing which must be borne in mind in all

* Please address communications concerning reprints, translations and reviews to Lieut. J. C. Bush, editor of this department.

questions of enlistment, organization, armament, equipment, administration, training, drill, discipline, etc. In all such considerations the vital question that should be asked is, What effect will it have in securing success in battle or in modifying the effects of defeat? Too often such subjects are considered apart from the battle to the success of which they are supposed to contribute, even though modern wars afford ample evidence to show the important effect they each and all have on the outcome of that great moral convulsion, that great struggle of emotions and of life and death which we call the battle. Every detail of military preparation and life should point to the battle in a way that cannot be misunderstood, and should prepare and fit every officer and soldier for that great struggle in which the most natural instincts of human nature have to be brought into subjection and forced into unwilling channels, for the natural and instinctive fear of pain and death must be overcome if success is to be obtained, and one of the chief objects of military training is to secure this very subjection of nature in the times of great emotional crises. How difficult it is to do this the events of every war amply testify.

Before going further, it is very necessary that we should have a clear idea of what a battle is. If we do not know what it is and what it involves, it is impossible to properly train men for it. As I have already stated, the battle is a great drama of life and death; it is a passionate struggle between two bodies of men, who each make use of the best weapons of offense and defense that they know of and can procure. The value of such weapons depends partly on their technical construction and properties, and on the requirements for their effective use being provided; but far more does it depend on their rational employment, and this in turn depends on the men using them. We must always remember that the value of any weapon depends on the man making use of it. There are moments in every hotly contested battle, periods of intense emotional strain, in which a stick or a stone is as useful as the most improved modern rifle, so far as practical effect is concerned, and even in which the men might as well be without weapons at all. Let us consider for a moment why this is so. Man has a tripartite nature—*spirit*, *soul* and *body*. These three factors must all be considered before we can understand what a man is. And the forces which come into play in each of these factors are respectively called the *moral*, *mental* and *material* forces which arise from or act on the threefold nature of every man. *The moral forces* arise from courage, ambition, love of country, *esprit de corps*, discipline, sense of duty, and such like motives appealing to man's highest nature, and which are independent of the intellectual and physical powers that a man possesses. They can be held by the weakest and sickliest of any community or body of men. *The mental forces* arise from education, training, instruction and practice. *The material forces* arise from numbers, physical strength improved by practice and training, the perfection of the weapons, and in the necessary conditions being supplied for their adequate use. Among the material or mechanical forces we must include the perfection of the "machinery" of an army, that is to say, the perfection of its methods of keeping up the supply of men and expendible stores, its organization, administration, armament, etc.

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Recognizing these forces which are at play in the sphere of human nature, we must also have a clear idea as to part that each plays in that sphere. Generally speaking *the moral forces* give determination to act; *the mental forces*, skill to act; and *the material forces*, capacity to act. In the short hour at my disposal I am not able, as I should like to, to enlarge more fully on this matter. But I have said enough to show you that it is very necessary for every one, who aspires to be a leader of men especially in times of great moral excitement and mental strain, to make as close a study as he can of human nature or character, its capacity and its weakness, not only in the individual but also in the mass.* For it is a curious fact that even if the individuals composing a mass of men are each of them brave and courageous and animated by the highest personal motives, yet when they are congregated together they are more influenced by adverse causes than a single individual would be under similar conditions. If an individual man is worth 1, two men are not worth 2, and so on. The reason of this is, that the single man feels self-reliant, he feels his individuality. But when situated as a mere unit in a mass of other men he feels his insignificance, and this tends to make him lose the idea of his importance and to make him less reliant on himself. He cannot have the same faith in others as he has in himself. He feels that in case of disaster his chance of escape is lessened by his movements being hampered by the mass of men around him, and being one of a large number he has not the same knowledge of the existing state of things as he would if alone. He feels his dependence and reliance on others, and this re-acts badly in moments of great strain and emotion. All these causes which influence men, individually and collectively, should be studied by officers who wish to attain the highest success in their profession and to fulfil properly that terrible responsibility entrusted to their care, viz.: the lives of their men and the fate of the nation and of the national weapon called the army. *The psychology of war* is a branch of military education and training that has been sadly neglected, especially in the English army, and yet perhaps nothing is of so great importance.

The organized, trained and disciplined collection of individuals, known as the army also has its moral, mental and material forces. *A battle is the contest between the moral, mental and material forces, possessed by the two opposing bodies. A battle is a very complex affair. The forces at work in it are very variable in their nature*, the moral forces especially so, and herein lies the test of a general commanding an army. He has to estimate from his own experience and judgment the value of the various forces acting on both sides, and as he rarely has exact data to deal with, military matters are far more of an art than a science. The ideal general, like the poet and the artist, is born not made, though education and practice has, of course, a beneficial result even on the genius. But the moral, mental and material forces at work in each of the opposing armies, are each and all extremely variable, and almost vary from day to day. Each class of these forces has an absolute value of its own at any given instant, and it also has a reflex action on the other two. A whole volume could be written on this subject; so my remarks on these very important points, must be of the very briefest

*This is especially necessary for General officers.

nature. Indeed, I must ask you to look upon them as the merest hints for your future consideration and study.

I have just stated that the forces at work in a battle are very variable in their nature; but the battle is only one phase of war, the most important doubtless, to which all others lead up to; and in considering the battle, we must not lose sight of its connection with what has led up to it and what will probably follow from it. Throughout a whole war, the same forces are at work as in a battle, and have the same variable nature, and it is most important to understand the causes of this variability.

The moral forces at work in a mass of men, which include courage, ambition, *esprit de corps*, discipline, etc., depend very much on the enthusiasm of the men composing the mass for the cause they are fighting for, on the success or failure of the previous operations and on the state of affairs. War is but a continuation of the national policy by force when all the resources of diplomatic art have failed to secure what is considered desirable for the nation's welfare, and consequently even the political conditions under which a war is begun have their effects on the frame of mind of the men sent into the field. Defeat and retreat depress the spirit of the men; success and advancing raise it. Badly conducted operations weaken the moral forces; well conducted ones increase them. Confidence in leaders is a very powerful moral force; frequent and vacillating orders is a very weakening moral force. Such factors controlling the moral forces are in their nature very variable, and so make the moral forces also variable.

The *mental forces* at work in a mass of men are the least variable *per se*; they alter but very slowly with the influx of recruits and young inexperienced officers from what they were at the commencement of the war.

The material forces given by numbers, physical strength, etc., also vary very greatly. Bad food and water, bivouacking, heavy marches in bad weather, long and forced marches, etc., all tend to lower the numbers, and capacity of the troops.

These forces also have a reflex action on one another. When the moral forces are weakened the men are not capable of doing as much as when the moral forces are at their strongest. Similarly when the capacity to act is weakest, the determination to act is at its lowest ebb, and the skill available for action is no avail. Thus though the determination, skill and capacity to act are each of them variable quantities, considered *per se*, they have also a mutual inter-relationship and affect each other for good or evil when considered in their mutual reactions one on the other.

These forces, which are always at work, often act spontaneously on the mass of men, *i. e.*, without immediate visible cause. This is a very important point to remember. Waves of feeling sweep over men when congregated together in moments of great excitement and danger, and they act spontaneously in accordance with them without further words of command, and often in spite of the efforts of their leaders to control them. Good troops have been known to fall back and retire in confusion even when no immediate danger was visible. The men get confused by the apparent dislocation of affairs around them; they get disheartened by what they think are not favorable conditions, and then a mere accident, a stampede of

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horses, or other slight causes sets them in retrograde motion. This is a very important fact to remember in dealing with bodies of men. It must be expected in every battle and the good general is one who knows how best to ward off the dangers that arise on such occasions. The usual effects of the waves of feeling referred to is to make the mass of men to advance, or if advancing to halt, or if halted or advancing to retreat. And this is especially the case if the men under fire feel or think that they have no large bodies of troops behind them to support and succor them, and if the men have been long exposed to danger and confusing or demoralizing conditions. We must ever remember and bear in mind that in war, and especially in that phase of the war known as the battle, the men and officers of both sides are working in a fog. Neither side knows the strength, and circumstances of the enemy; neither knows the mistakes made by the other. In the vast majority of cases decisions for action are the results of judgments based on very imperfect and often false information, and it is not a matter of wonder that in every battle a great number of mistakes are made by both sides. All that can be done in war and in battle is to take every precaution possible to try and insure success, to make sure that the information received is correct so far as it goes, and then to act correctly on such information. Though the judgment may err the motives and ends in view must be correct. If this is done, if all the chances possible are secured for success, then the result of the decisive act lies in the hands of the God of battles. No one can study closely the accounts of any battle without being strongly impressed with the overruling influence in it of the guiding hand of Providence. The relationship between foresight or preparation and what is called luck or fate is a very interesting and important study, and would prove a most fruitful source of study, but it is one that has not been yet taken in hand by any writer that I know of. The relationship however must be kept in view. In the most perfectly prepared contests, mistakes of the most serious and vital nature are constantly being made by both sides. Let us ever remember this in our criticisms of warlike operations, and let us always remember that the best leader is he who makes the fewest mistakes. From the very conditions under which war and battles are undertaken it is impossible that mistakes can be avoided. How much injustice would have been avoided in the past if this principle had only been recognized and acted on.

But let us now recall and enlarge our definition of *a battle. It is a contest between the variable moral, mental and material forces possessed by two opposing hostile bodies of men, each of whom is more or less working in the dark, and each of whom is trying to wear down and destroy the moral, mental and material forces of its opponent while trying to conserve its own forces.* In this destructive effort, the moral, mental and material forces of both sides suffer, and along the front of the battle varying success is met at different times and at different places, and that side is victorious whose forces as a whole were (1) sufficient to begin with, and (2) were, in the long run, best able to stand the wearing down efforts of the enemy. A modern battle between civilized foes is a long drawn out act, and may possibly in the future last for more than one day, and the ultimate object of military preparation, education, training and discipline is to so strengthen and in-

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crease the moral, mental, and material forces of an army as to enable it to withstand this great strain on the natural emotions of the sentient beings composing the army engaged in the battle. The great objects in every fight, as in every operation of war, are (1) to disorganize and demoralize the enemy, and (2) to prevent our own men being disorganized and demoralized, *i. e.*, (1) *to put the enemy into confusion* and so render him helpless, *and to frighten him*, and so to make him anxious to bolt, while (2) preserving your own men from the similar efforts of the enemy—these are the great underlying principles of every battle, and improved weapons and training have rendered the attainment of the first of these objects more and more easy, while they have rendered the attainment of the second of these objects more and more difficult. Thus in the days of hand weapons, the killed and wounded on each side would amount to half of the combatants. With the improvement of weapons and mobility, this proportion has decreased until victories are in this generation won and lost when a proportion of 1-10th are put out of action. The projectile throwing-weapons now in use are more effective in their power of producing confusion and intimidation than the weapons of former times, and it is probable that the proportionate losses to secure victory will be still smaller in the future. The effects of the small bore magazine rifle and smokeless power, of machine guns, and of the shrapnel and high-explosive shell fire of artillery have yet to tell their tale in war, as also the improved methods of making use of the fire of rifles and guns.

A battle is generally speaking composed of two great acts, viz., (1) the destructive act, and (2) the decisive act. The destructive act begins the fight and often lasts for some hours. During its execution each side is trying to destroy by fire the moral forces and organization of the other side in order to procure a successful issue in the final decisive act. The decisive act is of short duration. It is carried out as soon as the destructive act has sufficiently paved the way for its successful accomplishment. The destructive act is carried out by a more or less thin line of men and guns spread out along the front of the enemy, and who act by the fire of their weapons. The decisive act is carried out by force by a more or less compact mass of men who try to break through the enemy's front with their bayonets at some point which, if captured, will compel him to retreat if he does not wish to be annihilated or captured. The chief difficulty in battle is to assemble, in spite of the enemy's destructive fire, the necessary mass of men, required for the decisive act, at the right time and at the right place. In other words, the problem that we wish to solve is how to pass a mass of men over a belt of ground covered with a destructive fire, so that they may still possess energy enough to attack the enemy with the bayonet, and drive him from a vital point held by him.

THE MAN AND THE HORSE.

Of all the constituent elements of the military forces of a nation, of all the means employed in battle for the overthrow of the enemy, *the man, the armed man*, is by far the most important. These military forces can only accomplish that which the man is capable of. Everything that increases or diminishes the value of the man, everything that puts his life and health

in danger, has a similar effect on the military forces. All the weapons used such as rifles, guns, swords, and lances, receive their value from the capacity of the men who use them and from the power of the men to face them; by themselves they are harmless. The spirit of man must pass into them before they become of any value. Battles are not won by material superiority alone. We must recognize that victory or defeat is to a large degree a matter of *opinion* only. Each side seeks to inflict such losses on the other that the remainder prefer to seek safety by flight rather than risk the chances of destruction to themselves. In the survivors the spirit of self-preservation has proved stronger than the spirit of self-sacrifice. Each side accomplishes its object by acting on the moral senses of the enemy through his physical senses, and that side is victorious which, at the decisive moment, *believes* itself to be superior. "The secret of victory lies in the heart of the soldier." The judgment of the general as to whether he shall, at any given moment, advance or retire or hold his ground is not based on any precise calculations but upon the moral as well as upon the intellectual and physical condition of his men. And just as the soldier used his weapon to inflict losses on the enemy so also the leader hurls his living projectiles —his men—for the same purpose, and as the effect produced in the former case depends upon the perfection to which the weapon has been brought and the perfection of the training of the men in its use, so also in the latter case, the leader must know how to raise the spirit of his men, and strengthen it, how to give them power of resistance and offensiveness, and to cultivate in them, by example and discipline and training, in peace and in war, all those good moral qualities of the heart which make men rise above their own natural inclination. It is an error to suppose that men cannot conquer against greatly superior numbers; that they cannot make a frontal attack over an open space against an enemy in a strong position; that they cannot resist when half their number are killed and wounded, etc. All this men *can* do; and it is only in the ability of the men of one side to *do* more, and to *suffer* more, than the men of the other side, that victories are won. Victory does not constantly attend upon *ordinary* efforts; troops must also be capable of *extraordinary* deeds; for without these continued success is not possible.

Man is a complex and sensitive being. In danger he is constantly the victim of an inward "antagonism,"—the striving of the heart to overcome the fear of physical danger, the feeling of self-sacrifice against that of self-preservation. The enemy threatens his life and commands him to retire under penalty of death; his leader commands him to advance under the same penalty. And under such a penalty on both sides of him, every man would run away if his heart did not tell him that it is his duty to rid himself of the enemy's presence by destroying him. At every moment, therefore, during a conflict, as long as a man is master of his senses, it is important that the influence of everything which can strengthen his heart or moral qualities should be brought into play, and that all which unduly encourages the sentiment of self-preservation should be counteracted. Self-preservation should only be permitted when it is good for the cause, but should be forbidden when desired for the sake of the man himself. But at certain

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moments, under intense excitement due to the unaccustomed noise and sights and confusion, the moral and mental senses of the men often give way. They become incapable of reasoning; their minds become deadened, their actions are involuntary. And such are the moments when decisive decisions are made; victory or defeat then tremble in the balance.

When men thus lose their powers of reasoning, they may be said to be panic stricken. If, in this panic, involuntary action leads men to advance, victory will be secured. If, as more usually happens, the result of such panic is indecision, hesitation, and finally syncope of all action, the result will be defeat. This state of panic, this loss of power of reasoning, does not unusually imply lack of power to act, but only lack of power to act reasonably, and it usually occurs at the crisis of an engagement. Men act, at such times, only mechanically. For the time they are nothing superior to other animals; and, like other animals, they will run in the direction in which any one leads them. They are past the stage when they will obey a voice, even if they could hear one; they can only act as they see others act. If then, at such a moment, one of a group of men bolts to the front before any of the others bolt to the rear, it is certain that the rest will follow him. Before this stage, when the men could reason, such was not the case. All the senses were then alive, and the advance was only possible, or retreat checked, by the preponderance of the sentiment of duty over that of fear. It is evident therefore how much greater and more certain power a leader has at the final crisis than at any other time. It is evident also how much more certain victory will be, if, at such moments men are under visible leadership. And this again is a powerful argument for the use of closed bodies in masses, in making the final assault, that is at a moment when the enemy's fire is too wild to be efficacious.

The decision for victory or defeat is not therefore entirely obtained as the result of physical loss, but much rather of moral loss. Physical loss has undoubtedly a powerful influence upon moral loss, and thereby indirectly affects the decision. But the physical losses may be, and often are, vastly greater on that side which secures the victory. The decision thus always rests with that side which, at the crisis, has the moral superiority. The greater the physical losses endured, the less is the offensive power to destroy, and the moral power to resist. The physical power of a force to destroy depends largely upon its numbers; its moral power to resist defeat, depends upon the moral condition of the survivors. And since the decision rests entirely upon moral grounds, however few the survivors may be, yet they may be certain of victory, so long as their moral power to resist remains greater than the moral power of the enemy to advance. From this it is evident how false it is to teach either by theory or by practice, on the drill or manœuvre ground, the assurance of victory to that side which has a mere numerical superiority. This is to teach that all men are equal in fighting power, a fact which we know to be false. This is to place the most important element in the result of the decision in no place at all, when it ought to have the first place. Numerical superiority, if not too great, is not by any means of the first importance in war, and he who counts the numbers of the enemy too closely will be preparing the way for defeat. But in

European war, a numerical superiority of two to one is generally considered a sure means of success if possessed by even an ordinary general.

We should always remember that the physical powers of the men are very limited, and are greatly influenced by external influences. Men can only endure a certain amount of physical fatigue. If a man's powers are abused, they become fatally weakened. After a fatiguing action or march, men have need of repose to recruit their powers; they cannot for long be deprived of rest at night. For the efficient maintenance of their powers they require good and appropriate food, for men can only endure hunger and thirst for a short time. The climate and state of the atmosphere have a great influence on the human body; great heat or cold, violent and rapid changes of temperature, persistent wet weather, etc., are very trying to men, especially if they bivouac, and are not sufficiently or appropriately clothed according to circumstances. As soon as the fatigue and physical privations, or other abnormal conditions of existence reach a certain pitch, the human organism becomes deranged, leading not only to physical weakness and a diminution of the strength of the men, but also to disease and death. These effects may occur suddenly or develop slowly. These physical effects have their reciprocal action on the mental and moral powers. It very frequently happens in war that, in the midst of the disturbing conditions of war, a temporary indisposition of the mind has more influence than sound judgment on the men and their decisions. Though an energetic will can increase, in a surprising manner, the physical capacity of a man, yet on the other hand, physical suffering tends to paralyze the will, and to allow the sentiment of preservation in the presence of danger to get the upper hand and the panic state arises. This again may arise slowly or occur suddenly.

One other important point must be referred to, and that is the dislike that men have to any danger existing on their flank or rear, even if it is only a threatening danger. It gives the men and leaders a feeling of uncertainty and hesitation to advance. It requires the very best troops to ignore a danger on a flank or in rear when they have to move forward.

A few words on *the horse* in war. The value of the horse lies entirely in its physical powers of strength and speed, and in its capacity to be trained to stand fire, and the noise and confusion of battle. This last is a most important point and the use of untrained horses in war has often proved most disastrous. But the horse's strength has only certain limits of endurance which can be greatly reduced, like a man's, by unfavorable external conditions, privations, long marches, poor and inadequate food, and other adverse influences affecting the health and condition of the horse.

THE WEAPONS EMPLOYED.

The means employed for demoralizing and disorganizing an enemy are, as has been the case in all times, three in number, viz., projectiles, hand weapons, and brute force, now-a-days called fire, steel and shock. The modern projectiles are the rifle bullet and the artillery shell; the hand weapons are the sword, lance and bayonet; and the brute force or shock is obtained by the launching against an enemy masses of men or horses moving at speed. The greater the speed and solidity of the moving mass the

more effective it is in shock. As a rule the use of hand weapons and brute force are combined together with advantage. But when opposed to the fire of troops not yet seriously affected by the demoralizing influences of a battle, masses of men and horses moving over the open would be soon swept away. Consequently the employment of brute force is only judicious when the enemy's fire is or has become inefficacious, or when such brute force can be applied rapidly and suddenly before the enemy's fire can produce any serious effect on it.

Projectiles, for both offensive and defensive purposes, have now-a-days become the chief weapons used during the fight, though the actual victory has to be assured and secured by the use of brute force and hand weapons. The use of projectiles has now become so efficacious and deadly that the great difficulty to be overcome is the passing of the men over the fire-swept ground in such numbers and with so few losses as will enable them after a while, when they are near enough, to inflict such losses on the enemy as will permit of the use of brute force being successful. This problem has to be carried out bearing in mind the elements we have to deal with—the man with all his weaknesses, his natural instinct of self-preservation in times of great excitement, the exhaustion of his powers after considerable continuous efforts, the gradual oozing away of his moral qualities, his liability to get panic-struck, his fear of any danger coming from the flank or rear, the weakening effect of being in ignorance of what is going on around him, etc., etc. And in the effort to solve this problem, many "formations for attack and defense" have been suggested by various writers. I am not going to propose any formation here, I am only dealing with the principles underlying or rather, what is often another thing, the principles which should underlie them.

SPIRIT VERSUS FORM.

This brings us to consider for a moment if the specific formations, on which some writers lay such stress, have any real value in themselves. It is a well-known fact that in dealing with living organisms, their functions and acquired habits modify their outward forms. Form does not make life, but life controls form. So in the matter before us. If men are intelligently imbued with the spirit of war or battle, and with the conditions required to procure its successful application, then the form or mechanism suitable for the occasion will be forthcoming. The same "form" is not suited to all circumstances and requirements of the attack and defense, for all sizes of units, for counter-attacks and for advance guard actions, and other such temporizing combats. And when the conditions and objects of battles differ, the "form" must necessarily differ also. It is really astonishing to find the number of men who yet pin their faith to a particular kind of formation as a panacea for victory.

It cannot be too strongly impressed on the military mind that *success in battle depends more on the manner of conducting it than on the exact mechanism employed.* It is well to study attack and defense formations used under different circumstances, but do not be tied to any one of them. Some mechanism or mechanical grouping of the men and units must be adopted. That cannot be avoided, but this grouping should conform to the condi-

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tions of the case imposed by the enemy, the ground, the character of your own troops, and the purpose or object of the fight. But mere battle formations without the living spirit of battle go for nothing. On the other hand, if the spirit of battle exists, the mechanical formation adopted matters little provided the men are not so placed as to offer too great a target to the enemy until he is demoralized, and his fire thus rendered wild and inefficacious. As Lieutenant-General Sir Gerald Graham, V. C., remarks: "One great lesson for us to learn from the Franco-German War is the transcendent importance of the individual training of the soldier under his officers, with consequent fire discipline and knowledge of the tactical use of his arm. The German infantry had a weapon inferior to that of the French, and at the commencement of the war, *their tactical formations were very faulty, but everything was redeemed by the fine spirit and discipline of the officers and men*, which made them always push forward at the sound of the cannon, and which enabled them to reserve the greatest energy of their fire for the decisive phase of action. * * * Nothing can be more instructive than *the changes in German tactics*, brought about by their terrible losses in the early battles of this war. Nothing should more strongly impress writers on Tactics, with humility and a distrust of their own prescribed formations, than the fact that the German leaders, with all the foresight and the knowledge acquired during twenty years of careful training with the breech-loading rifle, including two wars, should yet have been ignorant of the breech-loader's actual power in the field, and consequently of the tactics required to oppose it."

The pet bugbear of those who advocate special attack formations is the confusion that arises in the shooting line from the mixing of different units. But an ounce of war experience is worth more than all the theories in the world. Mixing can only be avoided in the earlier stages of the fight. In the later stages of the fight brigades, divisions, and even army corps have been mixed in the determination to press the battle forward and force the enemy into retreat. Hence far more depends on the manner of conducting a fight than on the mere formations employed. All past history shows that in a hotly contested battle no true or definite tactical formation exists in the later stages of the fight, and that victory then depends not on formations nor on the actual losses sustained or inflicted, but on whichever side has the greatest determination to remain and advance; hence all "attack formations" can only be "starting" and not "final" ones. However good formations, —*i. e.*, formations suited to the requirements of modern warfare, and capable of modification to meet unexpected occurrences, have undoubtedly some influence in the fight, just as a well made man can do his work with less expenditure of strength than a badly made man. In a fighting formation, loss of strength is occasioned by confusion and loss of control. The truth of the matter is that if the spirit of battle (determination to advance) exists, the disposition of the various units, called the attack formation, has only a minor effect if the men do not offer too large a target to the enemy until they are within charging distance, and until the enemy is more or less demoralized. To carry out the desire to get at the enemy and resist him, each local commander must have, in his own sphere,

free use of all the units behind the firing line to use when and where he likes; he cannot and must not be tied by any theoretical organization for the fight, and consequently, *if occasion requires it*, the mixing of any units, large or small, must not be minded if the object of doing so is to give to the fight that bold, dashing, offensive spirit which raises the courage of the men and their determination to win. Officers must not in the middle of a fight be unnecessarily bothered and hampered with questions of not mixing units,—they must only think of getting at the enemy and overwhelming him with fire and shock. For a notable example of this, read the desperate and determined fighting of General Skobeleff before Plevna. If any man deserved victory he did, and what he did win was obtained by sheer determination to win.

We can now proceed to consider in detail the fundamental principles underlying the battle tactics of cavalry, artillery and infantry, in the order named. The ideal of battle is the hand-to-hand conflict; all that precedes this final phase of a fight is but preparatory for it and leads up to it. Cavalry is the ideal arm for the shock combat; artillery is the ideal arm for the fire combat; while infantry is the arm which makes use in a modified way of both the fire and the shock combat. We will first study the requirements for the ideal of battle—the shock; then the requirements for the fire preparation for it; and lastly, see how infantry try to meet the requirements of both fire and shock, and to carry them out. It must be clearly remembered that we are only dealing with the use of troops in actual contact with the enemy on the battle-field, and engaged in a life and death struggle with him.

BATTLE TACTICS OF CAVALRY.

The "force" of cavalry on the battle-field lies in the momentum of its shock, and this momentum is a product of a combination of speed and solidity at the moment of contact. This combination produces not only a material effect, but also a strong moral effect on the troops charged. And as the whole efficacy of the cavalry charge lies in its shock, care must be taken that the ground over which the charge is to take place does not offer any serious obstacles to its execution. For this purpose "ground scouts" are sent on ahead to signal back the presence and situation of any such obstacle.

For firing the line is the best formation; for shock action the column is the best formation. But in the charge of a column, the first or leading line is the only one that is of immediate importance for the charge. The succeeding lines are for use in the *melée*, that is for assisting the first line if it is checked, or for restoring success if it is driven back, etc. The first line is always thrown into confusion by the shock; the lines in rear are only reinforcements close at hand. In *a cavalry charge*, the "column" made use of in the charge is a very open one with the échelons in rear not directly behind one another, because cavalry turn and bolt direct to the rear if defeated. The échelons are from 250 to 300 yards from one another in depth because the speed at which cavalry moves enables it to move over these distances in ample time to afford help at the proper

time. The cavalry charging formation is not usually looked upon as a "column" though it is virtually so. We shall refer to this subject again presently in considering the question of reserves for cavalry. In *an infantry charge* the column made use of is a close one with the échelons fairly close together and directly in rear of one another, because of the slow pace of infantry and because they do not immediately turn to the rear and bolt precipitously if defeated as cavalry do. Numerous échelons behind one another are not required. Three to four échelons are probably all that are necessary for an efficacious charge.

As deep columns offer no advantages for the shock over a two deep line, the "solidity" required for an efficient charge is obtained by a continuous line of men riding knee to knee, and all moving at a uniform pace. This uniformity of pace is a very essential factor for securing solidity, and consequently all cavalry horses are most carefully trained in this respect. As the line moves forward, at the gallop, the horses press right and left, and the squadron intervals get closed up and other gaps are formed. It is now the duty of the rear rank to keep the front ranks solid and without gaps, and this duty is so important that the proposals made from time to time to do away with the rear rank have never met with any favor.

The moral effect of the charge will be the greater as it is more unexpected. Consequently, as regards the enemy, the charge should be secretly prepared and suddenly carried out, so that he may be taken by surprise and not given sufficient time to prepare to meet it. Under such conditions the best infantry can be successfully charged by determined cavalry.

The direction of the charge is of importance. The weak points, both mentally and morally, of an enemy, are his flanks. Hence both sides try, by manœuvres carried out during the advance, to work round the flank of the enemy and there to deliver the charge. This is a delicate operation, for a small difference in the judgment of time and space makes all the difference whether either side will attack the enemy in a flank or be attacked by him on the flank. It is in this preliminary manœuvring chiefly that the technical skill of a cavalry leader will be tested. The usual formation for manœuvring is a line of small columns at deploying intervals. "Cavalry manœuvre in column, and charge in line." To prevent a surprise coming from the flanks, "Reconnoitring Scouts" are sent well out to each flank.

The preliminary manœuvring of cavalry to gain the enemy's flank is not always possible when the charge is directed against infantry that have not yet been shaken or demoralized, on account of the efficacy of the rifle fire of such troops. Can then such infantry be successfully charged? A few years ago, a decided "NO" would have been given to such a question. But there has been of late years what we may call a great cavalry "revival," and the modern consensus of opinion is that the chief element in a successful cavalry charge is a cavalry leader who understands the moral factors at play in battle, and one who knows when to launch forward his cavalry in accordance with them. This "when" depends on the ebb and flow of the enemy's moral qualities. In every battle moments occur, as has already been stated, when the moral strain becomes so great that it only requires the very least thing to set even the best troops in retrograde motion. Consequently the ideal

cavalry leader is a man who will recognize these psychological moments in the fight, and make use of his cavalry before such fleeting moments pass away. The moral effect of seeing a line of galloping horses and men, with their arms gleaming, charging down and making the ground resound with the thunder of the horses' hoofs, is very great and very impressive, and if carried out at the right time must gain important results.

Thus to gain the highest effect in a cavalry charge, it should not only be rapid and solid, secret and sudden, but also opportune and, if possible, at the moment of collision, directed on the enemy's flank and rear. The conditions which allow of secresy, suddenness and opportuneness are as a rule so fleeting that cavalry leaders are not expected to wait for orders to charge, but must charge on their own responsibility and judgment when circumstances offer a favorable opportunity.

Though rapidity in executing the charge is of considerable importance now-a-days in order to prevent the enemy having time to prepare to meet the charge, and also to prevent the cavalry force being longer than necessary under the effects of such of the enemy's artillery and rifle fires as may be directed on it, yet the pace must not be so rapid as to cause the horses to be blown or out of breath at the moment of collision. It is indeed essential that when the shock takes place, the horses should still possess considerable energy for further efforts whether for the *melée* or for the pursuit or for the retreat. It has already been stated that each side manœuvres to try and reach the enemy's flank. But this manœuvring would only be undertaken when the charge had to be made over a greater distance than can be safely galloped over, due regard being had to the preservation of the horse's strength. We cannot safely manœuvre at the gallop. The fact of moving at the gallop means that the time is so short that the cavalry must move straight at its mark, and bring on the collision as soon as possible. Hence, when cavalry attempt manœuvring they do so at the trot. Then when about 600 yards from the enemy or 300 yards from the point of collision manœuvring ceases and line is formed and the gallop is ordered. The solid line now moves straight to its front for the crisis. It is the duty of the rear rank to keep the front rank a solid mass without gaps,—knee to knee and a uniform pace at the gallop is the secret of solidity now. Then when within 50 yards of the point of collision the "charge" should be sounded, at which every man should urge his horse forward at the utmost speed possible. This high speed is at this moment not only permissible, but very necessary for the utmost speed is required to secure the greatest momentum for the shock, while the time during which it lasts, only a few seconds, is too short for the ranks to be broken up by the speediest horses surging too far ahead. In the above method of procedure we obtain, by a gradual increase of pace, the high speed required for the shock without exhausting too greatly the strength and wind of the horses before the moment of collision.

Of all the arms, cavalry is the one which is thrown into most confusion in action even after a successful charge. Consequently it especially needs reserves. Usually two lines of reserves are provided, which are placed one in rear of each flank and clear of it. They are placed sufficiently near to the front line to be of prompt service, and so that they may come into play suc-

cessively one after the other. The practice now-a-days is to make the first line strongest, usually a half the whole force, for both moral as well as material effect. The reserves having to deal with disorganized units need not be so strong in numbers as the first line. If this first line is a very long line it is followed closely in rear by two or three "Succor Squadrons" whose duty it is to promptly assist the weak points of the long first line. The use of reserves is most essential for success in cavalry combats.

As regards the weapon for cavalry, there is no doubt that in a charge the lance produces the greatest moral effect, and hence its real value in a cavalry charge. For it is doubtful, so far as the material effects are concerned, if one weapon is better than another until the shock takes place. The lancer as well as the swordman, at the moment of collision, is chiefly engaged in urging his horse forward at full speed, and while so engaged cannot give much thought to his weapon. As this moment, speed and solidity are of paramount importance. In the *melée*, a sword is perhaps more handy than a lance, but in the pursuit a lance is by far the best weapon. Thus, the lance is the best weapon for cavalry, for though the sword is easier to use in a *melée*, yet the success of a cavalry charge is rarely decided by the *melée*.

Thus the fundamental principles underlying the battle tactics of cavalry, are solidity and rapidity at the moment of the shock, secresy and suddenness, opportuneness and being directed on the enemy's flank or rear, together with the preservation of the horse's strength, the use of successive lines of reserves and the freedom of the cavalry commander, to act on his own judgment without waiting for orders. Given these requirements, it is the duty of each cavalry officer to make such arrangements, *i. e.*, order such details as will enable these requirements to be fulfilled. These details can vary according to circumstances, but the principles or requirements for a good cavalry charge will always be the same.

The better able we are to apply the foregoing fundamental principles the better can we maintain the moral and material energies of the men, and produce a corresponding demoralizing effect on the enemy. The excitement of the noise and galloping will keep up the men's spirit and shake those of the enemy. The moral power of "the cheer" must not be omitted in the charge.

One word as to the use of dismounted cavalry. We must always remember that it is a temporary expedient for a temporary object. The use of cavalry on foot cannot be called fighting. Cavalry fight on horse-back; infantry on foot. For fighting on foot in very rapid manœuvres, mounted infantry must be used. These are infantry pure and simple who are only mounted on horses (unfit for other military purposes) or in wagons, simply to get them to the scene of action quicker. Once arrived there the means of conveyance must no longer be thought of by the infantry if the urgency of the case is great. Dismounted cavalry, on the other hand, must never forget their horses, for without these horses they cease to be cavalry. Consequently cavalry will rarely dismount more than ¼th its strength, leaving another ¼th to lead the horses of the dismounted men, and also leaving the remaining ½ mounted to protected the led horses and if necessary the retreat of the dismounted ¼th. But in the case of Mounted Infantry

⅞ths or the whole can be dismounted and the means of conveyance forgotten until the fight is over without affecting their character or usefulness as infantry. Thus dismounted cavalry can never take the place of mounted infantry. Unfortunately the constant mounting of infantry on horses has had the tendency of making them think too much about the preservation of this expensive means of conveyance.

THE BATTLE TACTICS OF ARTILLERY.

The "force" of artillery on the battle-field lies in the efficacy of its fire. "The first object of artillery is to hit; the second to hit; and the third to hit." And experience has shown that both the moral and material efficacy of all fire, whether of guns or rifles, depends largely on its being concentrated on a succession of special objectives. Better results are so obtained than if the several guns are allowed to fire on as many objectives at the same time. We have to consider the moral effect of fire as well as its material effect, and the moral effect caused by material losses is greater as the material losses are more suddenly and rapidly inflicted. Thus the rule for all firing is, now-a-days, the concentration of the fire on a succession of selected objectives. The choice of the objective at any given moment depends on its importance in the fight for the time being. Each objective would be fired at until its offensive power is crippled, or until a more pressing danger appeared. In choosing objectives, we must always remember that there can be no greater destructive fire, both morally and materially, than the flanking fire of artillery.

The long ranging power of modern artillery enables the fire of widely separated guns being directed on the same target, but we have to consider the fact that it is very necessary to have a complete control over the fire of the artillery so as to be able to concentrate its fire here and there as necessity requires, and also to be able to replenish its expended ammunition easily and rapidly. For this purpose the guns must be massed or kept together as much as possible. Consequently the massing of batteries is for the purpose of efficiently controlling and directing the fire of a large number of guns and for facilitating their supply of ammunition.

As the efficacy of artillery fire depends upon its hitting the target aimed at, great stress is now being laid on the rapid estimation of the range. This finding of the range is effected by the employment of range finders used by trained men, and by a careful and systematic placing and observation of the first few shots fired. Every round fired is now carefully watched to see where it will fall, and the usual system now adopted is to make the successive rounds fall under and over the target alternately, and nearer and nearer until the range is fully ascertained. Experience shows that this is the most rapid way of ascertaining the range. And even after the range is found a careful watch is made of every round fired to see that nothing has happened to cause the fire to deviate from the object aimed at.*

The control, concentration and watching of the fire being so very important, and even necessary in order to get good results, the artillery besides

*It must be remembered that in firing shrapnel, the boring of the fuse to insure a correct burst is as important as ascertaining the correct range.

being organized into batteries are now further organized into larger units of "brigade divisions" of three batteries each. The brigade division is the real tactical unit for artillery and must not be broken up unnecessarily. The regulation of its fire will fall chiefly on the lieut.-colonel in command.

As regards the opening of artillery fire in order to gain the greatest moral effect, it is better to wait for the deployment into line of the whole of the guns and then when the range has been ascertained by a few picked batteries, for the whole line to open fire suddenly and unexpectedly. The torrent of projectiles thus produced will have a very terrifying effect, and will tend to cause disorganization and panic or demoralization in the enemy's ranks. This method of procedure will also prevent the batteries being silenced in turn, as might happen if they opened fire successively.

To insure the possibility of effectively massing the guns and of controlling, concentrating and watching their fire, it is of the greatest importance that the senior artillery officers should be in the confidence of the G. O. C.,* and fully know his intentions, desires, and objects, and armed with this knowledge and if possible accompanied by the G. O. C. himself and the range-finders, they should arrive as early as possible on the battle-field ahead of their guns, and reconnoitre the ground for the best positions available for carrying out the work that the artillery has to perform. In the earlier stages of the fight the artillery is given free choice of the ground it requires. The artillery positions having been selected the range-finders are set to work, and staff or other officers are sent to meet the batteries, and to guide them to the chosen positions.

As artillery in motion is useless in battle the guns will move as little as possible, and when they do move, after having once come into action, they must do so as rapidly as possible. The efficacy of the fire of the artillery is but little affected by considerable alterations of range. Consequently unless for supporting hard pressed infantry or for giving moral support, guns would not be advanced until they can move forward 800 to 1000 yards at a time. The moral effect of even the presence of artillery is so great that guns are not allowed to be retired except by the express command of the G. O. C. the force. It is not now-a-days considered any disgrace to lose guns when they are lost while being fought gallantly and devotedly to the last. The arrival of guns and the retreat of guns are two great moral forces on which much depends.

The value of shrapnel and of shells filled with high explosives have yet to be proved in war. All military writers hint that the moral and material efficacy of these projectiles will be very great. They will certainly demand either great moral forces on the part of the troops having to face them than has been required hitherto, or a longer artillery fire fight to silence the enemy's artillery fire. This artillery preparation is now an absolute necessity in battles fought against troops armed with modern weapons and skilled in their use. The whole object of the artillery in all it does or tries to do is to prepare the way for, and render feasible the bayonet assault of the infantry of the army. It never fights for itself. Its whole spirit is that of self-sacrifice. If it does first fire on the enemy's artillery, it is not so much

* General officer commanding.

for its own protection as for the fact that the enemy's artillery must be subdued before its own infantry can advance. The artillery preparation is an absolute condition of modern fighting, and on its success depends in a very large degree the ultimate success of the battle.

The non-recoil quick-firing guns so much used by the navy are not adapted to land warfare on account of their weak shell and shrapnel power. The essential feature of such guns is that they should have no perceptible recoil. In the field on wheeled carriages this condition limits them to 6-pdrs., while in the navy where they can be rigidly attached to the vessel, the non-recoil principle can be used for very much more powerful guns.

Thus the fundamental principles underlying the battle tactics of artillery are the observation, control, and concentration of the fire of the guns, the simultaneous opening of the fire of a large number of guns from chosen positions, and moving the guns as little as possible when once within effective range of the enemy except to support hard pressed infantry. The sole object of the artillery, directly or indirectly, is to facilitate the forward movement of the infantry, and to render possible the bayonet assault, sacrificing itself if necessary for this purpose. How to effect this, *i. e.*, how to apply the principles required for so doing, is the problem that faces the artillery officer on each field of battle.

THE BATTLE TACTICS OF INFANTRY.

The "force" of infantry on the battle-field lies in the combination of two qualities—its fire power and its shock power; that is, on the efficacy of its fire and the earnestness of its desire to cross bayonets with the enemy. Both these qualities depend on the moral forces possessed by the troops, for demoralized troops can neither fire well nor face a bayonet assault. Infantry is the only arm which combines fire and shock in its method of fighting, but we must remember above all things that the hand-to-hand conflict is the ideal which infantry must try to arrive at, and that its fire is only useful as a means of preparing the way for it, and of making it feasible without entailing undue or crippling losses. And as the hand to-hand conflict requires more or less closed masses of men for its successful execution, the problem to be solved for infantry is: How are we to move men over ground that is being more or less covered with artillery and rifle projectiles in sufficient numbers to enable them to carry out an energetic hand-to hand conflict with more or less closed masses? In the first place on account of the great efficacy of modern artillery fire the enemy's artillery fire power must be somewhat subdued and crippled by our own artillery before we can venture to send forward our own infantry in any great numbers over open ground. This artillery preparation is absolutely essential when the enemy is armed with modern weapons and trained in their use, and has a fairly open field of fire in front of him to use his fire over. Where these conditions do not exist, as in savage warfare, the artillery preparation is useful in facilitating the assault, but is not essential. Supposing the artillery preparation to be carried out; what next? We are supposing that the infantry has to attack, over the open and in clear daylight, a well armed and trained enemy. This is the most difficult case. Our object is to move the infantry over the dangerous fire-swept ground in such a way as to avoid excessive

losses, and then to collect them in mass, still in organized units if possible, at a distance of 300 or 400 yards from the enemy with sufficient moral and material energy still left in them as a whole to advance vigorously to the bayonet assault. The only way to do this is to adopt at the longer ranges such formations and methods of procedure as will offer but a small target to the enemy's fire while allowing of great mobility in movement, and of taking and making use of cover. These special requirements, demanded by the efficacy of modern artillery and rifle fire, can be provided by the deployment of the men at the outset into a line of relatively small groups which later on can be still further extended into a more open order should the enemy's fire necessitate it. Close order formations should always be retained as long as possible from the "grip" and control they give the officers over their men and from the greater moral support they give to all in and near them. There is no mysterious element of success in the "extended order." It is only a "dodge" to avoid losses and so should only be used when the enemy's fire is still efficacious enough to require its use to prevent excessive losses.* The same remark applies to men making use of cover and to the use of very rapid movements under fire. They are only "dodges" to avoid undue losses and should always be avoided when possible, because the extended order lessens the control of the leaders over their men, and hastens on confusion; making use of cover tends to decrease the desire to advance and the moral forces so important in battle; and the practice of advancing by rushes makes the fire of the men wild and ineffective. A battalion coming into action should not extend into open order at once, but into a line of closed groups (say company columns to begin with), covered by a few skirmishers to guard against surprises; these groups will break up in time into smaller groups which will only fully extend when the efficacy of the enemy's fire compels them to do so. In this way a better control is kept over the men and a better direction maintained than if they were extended at the outset while mobility and power of taking and making use of cover are also secured to a high degree in this way.

When opposed to a well armed and trained foe, the battalions first sent into action have to be sent forward in fractions across the ground over which the enemy can maintain an effective fire. Each battalion usually sends forward half its companies, keeping the remainder as a battalion reserve. Each of these leading companies also as a rule sends forward half its strength to form a firing line, and keeps the other half as a company reserve or "support" as it is technically called. In some cases the firing line may consist of whole companies, and the supports would then be also formed of complete companies. The firing line, supports and battalion reserves, each move in whatever formations causes them to suffer least loss, but otherwise the closer the formation the better. The firing line has also to consider the question of keeping up an effective fire, so that when fire has to be opened the firing line has to adopt linear formations while the

* The disastrous fight at Isandlhwana, in Zululand, is a good example of a false use of the extended order. The Zulu weapons did not require its use. Even where the extended order has to be taken up, owing to the efficacy of the enemy's fire-arms, there are few battle fields where the firing line cannot easily get to within 600 or 800 yards of the enemy.

troops in rear may with advantage retain their close column formations as long as possible. The battalion moves forward in this way; its progress depending on the progress of the firing line. But the men in the firing line have only a certain given amount of "energy" in them. This energy is gradually being worn down by the enemy's fire and the physical exertions of the men, and a time comes when the advancing firing line loses all its "go" and unless fresh troops arrive within a few minutes, it will retreat. Consequently one of the conditions of fighting against a civilized foe, in order to secure a vigorous advance, is the use of a succession of reserves to propel or push on the firing line as it gets exhausted and used up. For this purpose each unit commander, from a captain up to the general officer commanding, should have sufficient reserves, under his personal control, to carry on the fight in his own sphere of action. The disposition, described above, of the company units in a battalion to form the "attack formation," allows of this system of successive reserves being employed to force on the firing line towards the enemy. This principle of successive propulsion is a most important one now-a-days as a means of keeping up the moral and aggressive forces of the firing line. Every war affords many instances of the steadying value of closed bodies close in rear of hotly engaged, extended, thin lines, and as weapons increase in demoralizing power, the more necessary is the moral influence of successive lines of reserves so placed as to be able to arrive in opportune time to the assistance of the firing line. These reserves should be maintained in as close formations as possible so that they may be well under control, and saved from the loss of moral force which takes place when they are extended too soon. But though the reserves must be so placed as to give their help at the proper time, yet they must not be sent forward before they are really wanted, or else they will soon be uselessly used up, and the firing line will become too crowded at too early a period of the fight, and the losses will be greater than necessary. Men hate being in such a position under fire, that they cannot return the enemy's fire. And those in the firing line are apt to think that the whole centre of gravity of the battle lies just where they are, and they will be always asking for reinforcements. These two causes tend to an early using up of the reserves, unless a very strict control is exercised over them. Hence the firing line of a battalion and its immediate reserves, the supports, should be placed under a leader, who should besides controlling the fire of the firing line regulate its reinforcement. This is a very important matter. We have to deal with human nature as we find it, and in moments of great moral strain the natural desires of human nature require all the control possible to prevent their developing into wild license.

The first requirement demanded of every reinforcement sent into the firing line, is that it should carry forward the firing line to a position nearer the enemy than it was before. This is the chief object of every reinforcement and it should be perfectly understood by every man of the reinforcing body. Each reinforcement should be composed of some recognized unit under its own leaders, such as a section, half company, or company, etc.; and when sent into the firing line, the reinforcements should be, as far as possible, kept together in the firing line, so as to be as little affected as pos-

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sible by the moral exhaustion of the engaged men. Demoralization is very catching and by keeping the reinforcing men together, they are better preserved from its enervating effects than if widely scattered. These fresh reinforcements, if thus kept together, will push on and carry the old firing line on with it until it in turn is exhausted itself, when fresh reinforcements are again required. The successive reinforcing and the fact that the reinforcements must be sent where the firing line requires reinforcing and not necessarily to their direct front, of course leads to a considerable *mixing of units*.* This cannot be helped, and indeed it cannot possibly be avoided during the later periods of a determined fight. All we can hope to do is to avoid any serious mixing of units until the real advance (from 600 yards and under from the enemy) to the bayonet assault takes place. After that the question of avoiding the mixing of units must give place to the necessity of propelling the firing line towards the enemy. As regards the formation of the reinforcements, many writers often quote Skobeleff's deduction from the fighting round Plevna, that an intrenched position can only be attacked by "successive lines of skirmishers." But we must remember the causes which made Skobeleff adopt such a mechanism for driving forward his firing line. The Russian artillery in 1877 was very inferior, and was used at ranges at which it produced little or no effect. Indeed it was so badly used, that it afforded no support to its infantry and did not demoralize the enemy.† The Russian rifle was only sighted up to 400 paces; and their infantry tactics aimed at the bayonet assault with little or no infantry fire preparation. Consequently the Turkish infantry when attacked were unshaken, and thus could use their rifles with deadly effect. Further, the ground offered little or no shelter for the dense formations so much used by the Russian infantry and which caused them to suffer enormous losses. Consequently under the circumstances, Skobeleff had to use a formation for his reinforcements which otherwise would be avoided, as leading to great confusion and undue mixing of units. It is *a* way, but not the only way or the best way of passing troops over a fire-swept ground to reach the enemy with the bayonet. The best way is, first to so demoralize the enemy with artillery fire as to render his fire, artillery and infantry, inefficacious, and then to move forward the attacking troops in as close formations as the enemy's fire still permits, especially as regards the troops held in reserve for reinforcing.

As each échelon of reserves is used up the one next in rear must send forward sufficient troops to take its place and to carry on its work, and as the enemy is approached, the distances between the successive lines or échelons of reserves must be closed up by degrees, so that they may be nearer at hand and more ready to act as the danger increases.

In all phases of a battle, we must, as far as possible, try to maintain the unity of the organized units. But we can lay too much stress on this point, and so hamper the progress of the fight. The chief use of the organic units,

* In action, the firing line can only move to the front or rear, but the troops in rear of it will often drift right and left to avoid an effective fire in spite of all precautions to prevent their doing so. This is another reason why reserves do not always reinforce the exact organic unit to which they belong.

† Except at the battles of Nicropolis and Lovtcha.

is for administration and supply, and orderly marching when off the battle-field, and for facilitating manœuvring and the supervision and distribution of duties on the battle-field. Advantageous as these objects are, yet occasions may arise in which these secondary advantages may have to be sacrificed to secure that energy and vigor of advance that is required to seize the laurels of victory. Consequently, though as a matter of expediency, the general officer commanding will not, as a rule, interfere with his brigade, divisional, etc., organization, yet in times of emergency, the battalions under a general's command are the units he has to deal with. In such moments he cannot be troubled with any ideas about not mixing units. The battle of Spicheren is a notable example of this. Indeed, the mere fact that the troops in the main body of an advancing column have to fit into a fight that has been already begun by the advanced guard shows that the complete preservation of all the organic units is not possible at even the earliest stages of a battle. The vast majority of tactical writers seem to entirely forget and ignore the advanced guard action in dealing with the question of the attack and of the formations and dispositions to be adopted for it.

Hitherto we have considered the advance as a mere movement to the front; we have, however, also to consider the question of the fire of the troops. This fire, when permitted, must be as efficacious as possible, in order to prepare the way and render feasible the forward movement without suffering crippling losses. As long range infantry fire is very feeble in its effects and demands a large consumption of invaluable ammunition to produce any adequate effect at all, the opening of a serious rifle fire should be delayed as long as possible, though in order to preserve the moral force of the men moving under an enemy's fire, a slow well controlled fire may be permitted, more to keep up the men's spirits than for any results to be expected from it. At ranges over 600 to 800 yards the formations adopted for the firing line, and for the reinforcements in its immediate rear should be such as to avoid losses more than to afford a strong line of fire backed up by the moral support of closed bodies. But once within the effective ranges of the rifle, safety must be chiefly sought for by killing or wounding the enemy. And as this can now be only effected by fire, we now require a strong firing line, which must be maintained at full strength by drawing on the reserves of men in rear of it. Thus the duty of the reserves is twofold, viz., to maintain the firing line at its full strength for firing and to propel it onwards when it can no longer advance of itself. The reserves have also to look out for and ward off flank attacks, but this is not their primary duty.

The moral and material effects of an efficacious fire depend both on its suddenness and on its concentration on a single objective. Consequently pauses are required in the fire, and the objects to be fired at must be carefully selected, their ranges judged, the sights adjusted, and the aim carefully made. The pauses are gained by the use of the volley, and the use of the whistle. Volleys are not well adapted to partially trained troops; for such troops the exclusive use of the whistle is the best as it demands less training and discipline to enable men to pay attention. By the pauses the men are steadied, and during the pauses the smoke clears away, the objectives can be changed or otherwise, the ranges judged, etc. The pauses should be

made over a wide front, that of a battalion at least, and the whole firing line of a battalion should be under an officer whose duty it is to regulate and control its fire and who should also control the sending forward of the reinforcements as already stated.

If the enemy can in any way ascertain where the bayonet assault is going to be delivered along the front of the line of battle, he will naturally move the bulk of his reserves to that locality, in order to better resist the assault. Hence it is necessary to attack an enemy along the whole front in order to tie his reserves down along that front and to prevent their being concentrated to resist the bayonet assault, because the front of the bayonet assault will, for all units over a battalion, be less than the front occupied by the firing line. With a battalion acting alone, the shock front and fire front may perhaps be equal without a serious weakening of the force or energy of the assault; but for larger units the shock front will always be a portion only of the fire front, or else there will be but little chance of the assault succeeding. It is only by localizing the assault that we can obtain sufficient men per yard to contain the enemy along his whole front and yet have sufficient men per yard to force the bayonet attack right home. With an army corps, the front assault may be one-fourth of the front of attack. With smaller units the shock front will bear a larger proportion to the fire front, the proportion increasing as the size of the unit decreases, until for a battalion the shock and fire fronts will coincide. This is *the principle of localization of strength, or rather of effort.* As Napoleon I. said, "To try and be strong everywhere, is to be weak everywhere." This is true both in tactics and strategy. The main effort must be localized, and it is during the long fire preparation that the general officer commanding makes up his mind as to where he is going to try his hand-to-hand conflict, and there he directs the mass of his reserves in time for the final decision of the shock.

This use of *successive "lines" of reserves*, and of *the localization of effort* necessitates a change in the disposition of the whole force on the battlefield. Formerly the force was disposed on 2 or 3 rigid lines, known as the 1st, 2d and 3d lines respectively. This nomenclature is retained now-a-days, though the idea of rigid lines is often erroneously associated with them (vide Drill Book of 1892). Now-a-days the 1st line is a line of battalions in fighting formation side by side. The 3d line is the general reserve maintained by the general officer commanding under his own orders either for carrying out the final general assault, or for forming a rear guard to facilitate a possible retreat. The so-called 2d line now-a-days consists of all the local brigade and divisional reserves lying between the 1st and 3d lines. The 2d line is not now-a-days intended to be used as a whole. It is really a group of local reserves for local purposes. The fragmentary and localized nature of modern battles, raging as they do around woods, villages, farms, etc., also demands this modern disposition of troops in depth providing a succession of reserves to carry the firing line up to the enemy's position.

Can a frontal attack be carried out now-a-days in the face of improved weapons and of improved methods of using them? If it cannot be done, then wars must cease. We hear and read much about flank attacks and the necessity of making them in conjunction with frontal attacks. This is cer-

tainly true, but we must remember that a flank attack is only a local front attack on a position lying on the flank of the main position held by the enemy. This flank position is almost invariably a weaker position than the main one, and for this reason and also because a victory there has so much greater results, it is right to carry out a flank attack when possible. But the tendency now-a-days is to strengthen the flanks while taking up too extended positions for the strength of the force, and so we may see in the next great war frequent efforts made to break through the enemy's front.

Troops are organized into units and as far as possible they enter into a fight as units each under their own officers. And one great element of success lies in the mutual action and help not only of the men composing the units, but also of the units themselves. No man or unit must work for itself alone, but also for the men or units on either side, and for the good of the whole force. General Skobeleff asserted that mutual action was the keynote of success. And consequently the fire of units must be so directed as to help on the progress of the adjacent units when possible, while the fire of the artillery should be so directed as to facilitate at first the general progress of the infantry as much as possible, and subsequently the special progress of the assaulting columns.

Hitherto we have only considered the requirements for carrying out an attack. But the requirements for the defensive are very much the same as for the attack, because the defensive, if we hope for any success by its adoption, must only be looked upon as a mere preparatory attitude for a subsequent offensive movement, to be undertaken when the enemy has been sufficiently weakened by the wearing down process that each side is endeavoring to apply to the enemy, to enable the offensive to be successfully assumed. At the crisis of the battle that side which is the least worn down, and has the most energy left to advance to the bayonet assault will be the victor, and the adoption of a defensive attitude means that the defending troops intend to temporarily make use of physical means for preserving their moral, mental and material forces as unimpaired as possible until the decisive crisis arrives.

In open ground the disposition of the troops on the defensive will be much the same as for the attack over the same kind of ground, except that the firing line may have more men put into it, at the expense of the company and battalion reserves, than in the attack, because the men, being more or less stationary and under cover, have not to advance across the open, and will not suffer so many losses as the attackers. Besides it is an advantage to bring all the rifles one can into action especially when the ranges are fairly well known as they should be by the defense. The local or 2d line and general or 3d line of reserves would be provided as in the attack. The presence of defended localities (woods, villages, etc.) in a position complicates matters a little, dividing the position into defensive and offensive portions. The offensive portions are those over which the defenders can freely advance in strength to the bayonet assault, and which consequently should not be encumbered with obstacles to such a movement. The defensive portions are those lying in front of the defended localities, and as it is not easy to issue in strength from such localities their fronts and flanks may be cov-

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ered with obstacles and works of any suitable nature or design. Each locality would have its own strong garrison and inner reserves which are under a special commander appointed to command and defend the locality. The intervals between the localities, *i. e.*, the offensive portions of the position, would be less strongly guarded, but would be fully provided with local only or 2d line reserves to carry out local counter-attacks on the enemy's troops who are attacking the various localities. At the closer ranges frequent local counter-attacks form the soul of the defense, and are often very successful in their results from the demoralized and disorganized condition of the assaulting troops. The moral advantages of advancing to the attack are so great that the defenders must try and secure them whenever they can do so in order to overcome as much as possible the demoralizing tendency of seeing the enemy continually advancing even under a hot fire. But the local counter-attacks must not be permitted to advance too far. The final and decisive counter-attack lies in the province of the general reserve, the direction of whose attack depends more or less on the direction of the assailants' bayonet assault.

The defensive requires a capacity for more patient endurance than the offensive, because it has a more weakening effect on the men. Consequently the principles of the offensive—the aggressive forward movement obtained by the forward propulsion of the firing line by successive reinforcements being sent forward into it, the mutual coöperation of the various units and arms and of the men composing them, and the local concentration of effort, should be adopted by the defensive whenever possible.

The greater the masses of troops engaged the more important is the necessity for the preliminary preparatory fire combat as a preparation for the decisive act, and the longer will this fire combat last. The reasons for this are as follows:—The larger the forces engaged (1) the less is the influence of the superior commanders felt in the details of the fight. (2) the less is the effect of any irregularities of the troops, and of the accidental circumstances of the ground, etc., and (3) the deeper is the order of battle which allows of more men being available to renew the fight as it gets exhausted. The larger the forces engaged the more men there are per yard of front. An isolated battalion may effect its object with 2 men per yard of front, but an army corps on the offensive requires at least 10 or 12 men per yard of front, and on the defensive 6 to 7 men per yard of front. The increase of men per yard of front is gained more by a thicker grouping of the local and general reserves than by a contraction of the front taken up.

The formation, or rather the disposition of the various units for attack and defense to carry out the above principles, depend on circumstances. They vary for the attack and defense for different sizes of units, for counter-attacks, for advanced guard actions, for temporizing combats, etc. Thus sections and half companies, and troops on outposts, and other advanced duties entailing temporizing action, do not require to be sub-divided into more than two échelons; the same remark may be applied to a battalion on the defensive, when posted between other battalions; and as the local counter-attacks have to be carried out suddenly and rapidly, so as to make them unexpected by the enemy, and as they have to be carried out over

fairly short ranges, they only need for their execution, a strong firing line, closely followed by a line of closed bodies for threatening a bayonet assault. The formations required for passing men over a wide, fire-swept belt of ground, are not here required. But the final and decisive counter-attack requires a deeper and more solid formation than the local ones. Further, although all foreign nations with battalions of four companies each, place two companies in the fighting lines side by side, each providing their own supports, and keep two companies as the battalion reserve, as a normal formation for the attack of a battalion, yet in the defensive they advocate placing three companies side by side in the fighting lines, with only one company in reserve, and that each of the three leading companies should place two or three sections in the shooting line, with two or one respectively in support as a company reserve. Lewal and other writers, even advocate such a formation for the attack, on the ground that at the commencement of a fight, the direction of the final assault is not accurately known and that the attacking troops are to some extent on the defensive during the period of preparation. Berthaut discusses the question of extending one of the two companies in the fighting line of a foreign four company battalion as skirmishers, with the others in support, but pronounces against it as giving too wide a front for a captain to look after, and as tending to cause an undue mixture of units at too early a period of the fight, but he adds, that often an entire company must be so extended, as when an advanced guard is surprised. Verdy du Vernois always also says that the firing lines "may, if necessary, be composed of entire companies, and even, if needs be, of the whole of the two leading battalions" of a brigade of six battalions. Thus units that usually have to provide their own reserves, may in emergencies have to have their reserves provided by other units. Battalions should be trained to having four, six and even all their companies in the shooting line. Further, the mechanism for carrying out the fight varies with the ground and the cover it affords, the efficacy of the enemy's fire, and the discipline of the troops. The less disciplined the troops, ruder and cruder ways must be adopted for carrying out the principles of the attack and defense.* Of all the arms, cavalry alone can claim any kind of permanence in its fighting formations and dispositions, but on the other hand, the efficient and skillful leading of cavalry is a most delicate and nice operation, as it involves a close judgment of time and space and human nature.

CONCLUSION.

The principles that have been considered will always hold whatever may be the armament and projectiles of the future. In war now-a-days, we

* Thus my lecture on *Infantry Fire Tactics suited to the Canadian Militia* has been criticised because no reference was made in it to the use of organized groups in the firing line. The use of such groups is, in my opinion, only possible with highly disciplined troops, and is not adapted to the Canadian Militia with the few hours training they have annually. For such partially trained troops the whistle should be entirely relied on for controlling the fire, with the aid of pauses over a wide front. The normal attack formation best adapted for the Canadian Militia is 2 companies extended as skirmishers with 2 other companies in supoort,—these 4 companies being under a major. The remaining 4 companies would be in rear as a battalion reserve. The captains in the shooting line have then only *one* duty to perform—the direction and control of the fire of their men in shooting line; the captains with the supports have then also only *one* duty to perform—the

have to deal with the small bore magazine rifle, smokeless and "noiseless"* powder, rapid-firing, rifle-calibre machine guns, the shrapnel and high explosive projectiles of artillery, and the rapid movements of mounted infantry aided with improved methods of telegraphy and signalling. Even on the battle-field we may expect to see balloons used by both sides to oversee and obtain information of the enemy.

The small bore rifle used with the new chemical powders has a very much flatter trajectory, and is far more accurate in its shooting powers than the rifles of the past, while the smokeless and noiseless character of the new powder renders it much more difficult to ascertain where the enemy is or from what spot or direction his fire is coming. But by the use of this powder the targets aimed at will be much better seen, and much better shooting may be expected in the future than in the past, especially when we consider the improved methods of making use of the rifle that have been now so universally adopted, and which have not yet been tried seriously in war.

Rifle-calibre machine guns are nothing more in effect than concentrated infantry fire. They are only mechanical means of obtaining an intensified infantry fire on certain objectives, and consequently their employment is governed by the principles governing the employment of infantry fire.

Shrapnel projectiles have now been adopted by every civilized nation, though no extensive use has ever been made of them in war. They have been in use in the English army during the whole of the present century, but the attention of the continental nations of Europe was only seriously attracted to them by the successful use made of them by the Russians on two or three occasions in Asia Minor during the Russo-Turkish War. Peace experiments indicate that a very considerable effect may be expected from them, so much so that many foreign writers on artillery matters speak of them as very deadly and demoralizing. If they do prove so, then an efficient preliminary artillery preparation for the infantry assault will be of far greater necessity than in the past.

The continental nations of Europe are now making use of long shells filled with high explosives, from which they expect great results not only from their probable demoralizing effects, but also from the material effects produced by their being detonated.

All these and similar details will probably modify the way of applying the principles underlying the battle tactics of the various arms, but these principles themselves will remain unaffected and will last for all time. Improvements in weapons and projectiles, and in the methods of using them are in reality only improved ways of demoralizing the enemy, and so of making the natural instinct of self-preservation in him overcome the acquired instinct of self-sacrifice. And consequently the chief lesson to be

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reinforcing of the shooting line under the direction of the major, and the gradual approach of the supports to the shooting line. The double duty is better adapted to more highly trained officers than the Canadian Militia system is capable of supplying.

* This powder is not really noiseless but the sound of its explosion is considerably less than that of the ordinary black powder.

learnt is that, in the face of the improved weapons of to-day, and of the improved ways of using them, a far greater moral and mental training is required of the men, being trained as soldiers, than heretofore.

In concluding my remarks I must ask you to remember, what the time allotted to me has prevented me from entering into, that the methods of enlistment, organization, and administration and the armament, equipment, training, drill, discipline and efficiency of the troops on both sides have also their several effects on the exact method of applying the principles we have been considering this evening. We must further remember that the attack and defense of woods, villages, and other localities, and the fighting carried out in mountainous regions and against savage enemies, and in night operations, etc., all demand special methods applying the same principles. These exact and special methods under special conditions and circumstances, I recommend to your special study as being a most fruitful means of acquiring a true grasp of the military art. Bnt above all, remember the value, nay, the necessity of simplicity in all the formations and mechanism used for carrying out the principles of modern fighting. In the confusion and demoralization of the fight, simplicity in its mechanism is of paramount importance, and though simplicity is desired in all things in war, yet even the simple is often difficult to carry out. Consequently there is every reason why simplicity should be always aimed at.

The Franco-German War shows how necessary it is that the adopted tactical formations should be capable of being changed during the course of a war in order to meet the unexpected conditions which new weapons impose,—conditions which no peace experiments can make us fully foresee. And here again we find the great value of simplicity in war.

One other suggestion I may make in conclusion, is that, in the face of the efficacy of modern projectile weapons, all troops not advancing to the assault, should be hidden from the sight of the enemy, even if artificial cover has to be provided for that purpose. It is hard to hit or even to fire at what you cannot see.

N. B. The reader is referred to an article on Captain Hœnig's works in the December number (1892), of the *Journal of the Royal United Service Institution* of London, Eng., as affording an excellent illustration of many of the principles referred to in the above paper. (C. B. M.)

THE STRATEGIC VALUE OF CANADIAN RAILWAYS.

By Lieut.-Col. T. C. SCOBLE, Retired List.

Selected Papers. Canadian Military Institute. (By permission.)

THE construction of railways in Canada during the past twelve years has enormously increased the defensive power of the Dominion. Prior to the American Civil War (1861–64) armies relied chiefly upon wagon transportation over common roads. In cases of retreat, pursuers and pursued were much more nearly on an equality than now when the line of transportation is by rail. Of course, a retreating army then de-

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stroyed roads and bridges to retard pursuit; but communications could, in general, be soon restored by fords, pontoon bridges, or other improvised expedients. It is widely different when a retreating army sends its baggage and stores by rail, marching after them without incumbrance, while the advance of the pursuing force is retarded by the necessity for reconstructing bridges of sufficient strength to carry railway trains, and in order to repair or relay the track, even if they have the material for so doing at hand. Again, the retreating force is presumably drawing nearer to its base of supplies and reinforcements, while the pursuer is increasing his distance from his base, with a constantly augmenting danger of having bridges destroyed, and communications broken, in his rear. The one retires rapidly on an unbroken line of railway in good condition, the other advances slowly on a broken line which must be reconstructed before it can be utilized. Without enlarging upon this theme, it may readily be understood that in more than doubling our mileage of railway, in the space of twelve years, we have increased, in ratio, our ability to sustain an attack and to prolong the defense of our country.

It may be remarked that in considering this question I am adopting the Fabian policy. Considering the probable disparity between the attackers and defenders in case of invasion, this would be (in my opinion) the true line of defense. Retiring slowly, defending obstinately every favorable position, and taking advantage of every opportunity of striking at the enemy's line of communications, wearing him out in a series of skirmishes, rather than risking decisive battles, is the method historically and tactically indicated as the best for Canada. In order to do this successfully, there must be certain defined lines and indicated positions to be defended at all hazards, and it is to the consideration of these questions that I propose to devote this paper.

In 1812 the Americans intended in the first campaign to reduce Amherstburg and advance through Western Ontario; to occupy the Niagara District, and to move upon Montreal via Lake Champlain. This campaign failed at all points. In 1813 they proposed to retake Detroit and reduce Amherstburg, to capture Kingston and York (Toronto), and to attack Montreal via Lake Champlain, and by descending the St. Lawrence from Sackett's Harbor. In the first part of their programme they were successful, and they burned York, but completely failed in their operations on the Niagara peninsula, and in the combined movement on Montreal. In 1814 the attempt to recapture Michilimackinac failed, the retaking of Fort Niagara failed, and as the plan of campaign on Montreal and Kingston was contingent on their success on the Niagara frontier, it was never attempted. The close of each year saw Canada free from the foot of an enemy. Where the British and Canadian troops fought on defensive lines they were ultimately successful,—where they assumed the offensive, as at Oswego and Plattsburg they were defeated. This is the lesson of history.

Our base of supplies being Great Britain, and our line of communication the Atlantic Ocean, we must trace our strategic lines of rail from our seaports. The farthest point reached in Cape Breton Island is Sydney, the eastern terminus of the Intercolonial Railway. But the Gut of Canso in-

tervenes between the main land of Nova Scotia and Cape Breton. This strait is about 2½ miles in breadth, and an enemy's war-ship occupying the strait would cut off all communication between Cape Beton and the main land. Halifax, therefore, with Pictou as an alternative, must be our principal depot on the Atlantic sea-board, in Nova Scotia. From both these points independent lines of rail converge into a single line at Oxford. Between that point and Moncton, an enemy in possession of the Bay of Fundy, or of the Chignecto ship canal, could cut off communication with Nova Scotia; or an enemy advancing along the line of railway between St. Stephen in Maine and Moncton, passing through St. John, could accomplish the same purpose. The Maine Central, joining the International short line (C. P. R.) at Mattawamkeag, affords easy access to the heart of New Brunswick at Fredericton, whence a line runs directly to Chatham, again intercepting the main line of the Intercolonial Railway. From Fredericton north to Rivière du Loup, another line intercepts the Intercolonial, which renders ports to the east, (Metapedia, Dalhousie, Carleton, Bathurst or Shippegan) on the Baie des Chaleurs unavailable as depots of supplies for Quebec and Ontario.

We are driven, therefore, to consider the Gulf of St. Lawrence as our main channel of communication with our base of supplies; the more so as a small naval force could effectually close the passage between Cape Breton and Newfoundland on the east, and the Straits of Belle Isle on the north-east, converting the Gulf of St. Lawrence into a "mare clausum."

Quebec, protected by the fortifications of Levis, and flanked by the difficult channels between the islands, below the island of Orleans (which might be rendered impassable by torpedoes), affords a natural *entrepôt* for supplies that could hardly be surpassed. When the line of rail now constructed to St. Paul's Bay is completed to the Saguenay, the voyage could be shortened by 150 miles. But for the purpose of this paper we will suppose the strategic depot of supply to be located at Quebec, and the first strategic railway of importance to be the north shore line of the C. P. R., between that city and Montreal. Where and how is this line vulnerable?

From Lake Temiscouata, westward for nearly 100 miles, parallel with the river St. Lawrence, extends the rocky and mountainous ridge known as the "Height of Land." This rugged ridge is covered with forests, through which the roads are few and difficult. Where the international boundary line dips to the south it follows this ridge until the 45th parallel is reached when the character of the country is changed, and from Sanstead to Lake Champlain, no natural obstacles exist of sufficient moment to impede military operations. This is the "Gateway of Canada," which affords easy and inviting access to the heart of a populous country where roads are good, and railways and canals facilitate the transportation of supplies. No enemy will attempt to cross the rocky fastnesses of the Height of Land, while this open roadway lies at his feet. Moreover, Rouse's Point was fortified at an expense of $71,253.26 in 1880. According to a report made by Lieut.-Gen. Sherman in the following significant language, "This most valuable fort and property has never been garrisoned, but should be, for it is the true key-point of all that frontier. In my opinion this is the time to prepare for any

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complications that may arise in that quarter." An expedition formed behind the shelter of that fortification could descend the river Richelieu to Sorel, and strike at the North Shore Railway above Lake St. Peter, and obstruct the navigation of the St. Lawrence by torpedoing the channels between the islands in that part of the river. Hence Sorel is a point that must be protected. To fail in this would vitally affect our line of communication with the base of supplies.

The numerous lines of railway converging on Montreal are a combination of strength and weakness. Stretching fan-like into the country they would enable the inhabitants of the rural districts to the south to fall back to the Island of Montreal as a refuge for their families with their flocks and herds, while the defending force could dispute every bridge and crossing, destroying as they left them, and finding shelter behind the broad St. Lawrence if driven to retreat by the numbers of the enemy. The defenses of Montreal consist in the rapids of the rivers by which the island is surrounded. From the head of the Lachine Rapids to below St. Helen's Island the front of the city is unapproachable. The mountain, if fortified, and armed with heavy guns, would prove an impregnable fortress unless taken in rear, which could not be done so long as the river above and below is properly defended by gunboats.

The North Shore Railway curves to the north behind the Island of Montreal, and does not touch the Ottawa River until nearly opposite L'Orignal. From thence to Ottawa it would require to be defended by gunboats. Ottawa must be defended, not only as the seat of government, but as the distributing point for arms and munitions of war for the whole western country. From thence there are two prominently strategic lines of rail, the Canadian Pacific via Carleton Junction, and Smith's Falls to Toronto, and the Canadian Pacific from Ottawa to North Bay, and thence via Grand Trunk (northern extension) to Toronto. Although the former is so far removed from the frontier as to be pretty safe, it is tapped by no less than ten lines of rail which run north and south. Consequently, an alternative route such as that afforded via North Bay would be essential to safety. From Toronto west the strategic lines are evidently the Grand Trunk railway to Sarnia via Stratford, and the Wellington, Grey and Bruce via Harrison to Southampton and Wiarton. Guelph, Brantford, Stratford and London would form a quadrilateral of intrenched camps which it would be difficult to reduce, and impossible for an enemy to leave behind him. Within this area could be collected the resources of the western peninsula, in men, arms and supplies.

From North Bay to the north shore of Lake Superior the line of the C. P. R. is inaccessible from the south, save where the Algoma branch touches it at Sudbury. For 183 miles (Peninsula to Fort William) the line of rail could be cut at many points unless defended by gunboats.

From Fort William to Winnipeg the line of the C. P. R. is unapproachable so long as Winnipeg and Port Arthur are held.

As the Canadian Pacific Railway could be cut at any point between Winnipeg and Calgary it is unnecessary to consider it as a strategic line between those points. The base of supply for British Columbia and the greater part

of the Northwest Territories must, therefore, be independent of that for the rest of Canada.

The question naturally arises, can nothing be done to preserve the line of communications between Winnipeg and the base of the Rocky Mountains, a distance of 840 miles? The Great Northern, on the American side of the boundary, parallels the Canadian line at a distance of from sixty to one hundred miles to the south, as far as Medicine Hat (660 miles). The N. W. Coal and Transportation Co.'s line (Galt line) joins the C. P. R. at that point and runs southwesterly across the boundary line to Helena, which is the centre of a network of railway lines. Consequently a force could be concentrated at Helena and move upon any point that might be selected in order to cut the line of communication. There is no natural obstacle to prevent invasion of the Northwest Territory in all this distance, save Wood Mountain and the Cypress Hills until the south branch of the Saskatchewan (and its tributaries) is reached. Medicine Hat being at the point of crossing at the Saskatchewan and the C. P. R. is naturally the point for establishing a corps of observation, with a chain of outposts along the boundary line. Armored trains carrying long range shell guns would be a useful feature in repelling an unexpected attack from a small body of the enemy. But a serious attack from a large force at an unexpected point could hardly be repelled in so scantily populated a country. Any force holding Medicine Hat would have to fall back on British Columbia, or place the Saskatchewan between them and the foe.

Fortunately the gauge of most Canadian railways is the same (4.8½), so that the rolling stock is transferable. This consists of

1,771 Engines.
1,495 Passenger Cars.
525 Baggage, Mail, Express Cars.
32,383 Box and Cattle Cars.
16,972 Open or Flat Cars.

The experience gained during the American war shows that to supply an army of 100,000 in the field by means of a single line of rails the proportion of rolling stock should be engines 0.25, and freight carriages 6.0 to every mile of road. For conveyance of troops we may estimate one carriage for 50 men, and one engine to every 1000 men exclusive of baggage. Roughly speaking a train should carry a regiment of infantry, (8 companies) with baggage (no tents), half a battery of artillery (140 men, 130 horses, 3 guns, 12 carriages) or 1 squadron cavalry (160 men, 120 horses, 6 carriages). Thus a division of 10,154 with the regular proportions of cavalry, artillery, engineers, infantry, military police, commissariat and medical departments would require 24 trains consisting of:

24 Locomotives.
203 Passenger Cars.
153 Horse Cars.
6 Flat Cars for Guns.
106 Flat Cars for Carriages.

Supposing, therefore, that one-half the rolling stock belonging to Canadian railways was concentrated upon the strategic lines, we should be able

to move simultaneously an army corps of 30,000 men to any given point for concentration.

But in order to effect this, something more is necessary than the possession of the rolling stock, and the mobilization of the troops. From a book published by Ulrich Meyer, of the German railway corps, we may gather many interesting particulars of the organization of a military railway service. Since 1890 Germany has organized a railway brigade composed of 18 military railway corps, each consisting in time of peace of 5 officers and 122 men, and in time of war of 11 officers and 233 men. The men selected for this service are those who have had technical training as railway employés, bridge builders, smiths, engine-drivers and firemen, carpenters, miners, etc. They have for their training a special railway running from Berlin to Lassan, about 50 miles, which is entirely run as a military road. Here corps are instructed in the transport of ordnance, ammunition and baggage, as well as in the embarkation and disembarkation of troops and horses. The railway corps act as instructors, and when not engaged on this duty they receive technical instruction or drill. The second year of service is spent either in the balloon corps, in telegraphy and the construction and destruction of railways, telegraphs, bridges and buildings. These exercises are made as practical as possible, and although the duties are severe there is great competition for admission to the railway brigade, as service in that corps is a great recommendation when afterwards seeking employment.

Thus the German war office has at the outbreak of war several thousand of trained railway men, who can not only build but operate a railway in all its branches, and who are experienced in the embarkation and disembarkation of troops.

Not to be behind Germany, France has an organized body of railway men composed of nine companies consisting in war time of nine officers and 228 men in each. The civil employés of various lines are also organized into five divisions each consisting of 1273 officers and men.

The military railway service of Russia consists of five battalions of 5 companies containing 255 officers, N. C. officers and men in each. This corps built the military line from St. Petersburg to Tzacko Selo, six miles in length. Over this line passes all the traffic between the city and the camp located at Tzacko Selo. All Russian railways are, however, under military superintendence, and the railway servants are generally soldiers.

Austria possesses a railway corps composed of 12 companies, each containing 5 officers and 111 men on a peace footing, and double that number on a war footing. The Banjaluka Doberlin line, 65 miles in length was built, and is operated by this corps.

Italy has a special railway corps consisting of four companies, each of 4 officers and 100 men on a peace footing, increasing the strength to 8 companies of 5 officers and 270 men in time of war. In order to train these men, the Italian war office has made arrangements with the Turin Torre-Pellice Railroad Company by which the operation of the road is left to the military authorities, while the financial management is left with the company-

England has done less in this direction than any other of the European powers. It has a volunteer railway brigade, composed of the managers and servants of several of the railway companies, but there is no military organization capable of accompanying an army in the field. Belgium, Holland, Bulgaria, Roumania and Portugal have each one railway company specially trained for the work of operating a railway.

The United States where railway corps originated no longer possesses any; nor have the armies of Sweden, Norway, Denmark and Turkey any special military railway service.

It may be premature to suggest such an organization in Canada where there is no commissariat, medical, transport or quartermaster-general's departments,* and where there is no provision for the formation of a brigade, much less of a division or army corps, but it is well that these details should be considered even if not immediately effected. Especially would this be necessary if, in consequence of complications with Russia, the Canadian railway system should be called upon to furnish transport for men and material to the East. And, if the United States were to join with Russia (and more unlikely things have happened), Canadians would feel the strain of being compelled to meet the requirements for the whole defensive army in such branches as the railway service corps.

The scope of the subject of this paper is so extensive that a short essay must necessarily be suggestive rather than exhaustive. It is hoped, however, that in drawing the attention of members of the Canadian Military Institute to the question, the object of the writer has been gained.

COAST ARTILLERY PRACTICE.

By Colonel J. B. RICHARDSON, R. A., Commandant, School of Gunnery.

(*From the Journal of the Royal United Service Institution.*)

COAST defense is capable of easy solution as long as the absolute command of the sea is in the hands of friends. Neither the open coast nor sea fortresses can be seriously attacked, though irritating raids are possible or even probable. But party government renders the keeping up of an all-powerful fleet a difficult matter, and modern invention has produced such a change, not in the general principles but in the details of sea fighting, that, in the absence of actual experience, a feeling of insecurity is engendered in many thoughtful minds, which gives force to the argument that it is unwise to put all the eggs of defense into one basket, and renders a careful preparation for coast defense a sound step for a rich nation to take.

Coast defense, treated merely with regard to land forces, divides itself into two distinct headings:—

1. The defense of open coasts from landing in force.

2. The defense of coast fortresses, and the land and limited area of sea immediately adjoining.

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* A Quartermaster-General has since been appointed.

With the artillery practice of the first of these problems I do not propose to trouble you. The defense of coasts outside the influence of coast fortresses is, in the absence of naval protection, best undertaken by a field army under generals skilled in ordinary field warfare. Practice in this work is, no doubt, desirable, and it is somewhat remarkable that the peace manœuvres of a nation like ourselves, with such an extent of coast line, nearly all run in the direction of fighting imaginary battles inland, and rarely assume the form of coast defense in conjunction with the navy. There is, however, little or nothing technical in this form of defense.

With coast fortress defense it is different. Here it is most important that officers in command should have a considerable amount of technical knowledge, for a large proportion of the troops they deal with need much technical knowledge to make good use of the instruments given to them for defense. No portion of the army so much needs the application of discipline, as defined by Hamley. He says:—

"Discipline means cohesion of the units and suppleness of the mass. * * * It means the most efficient combination of many and various parts for a common end."

In our service the defense of a sea fortress is carried on simultaneously by several necessary branches. Where this is the case there is a tendency for each branch to work entirely for its own hand, regardless of the rest, although all are working for a common cause. Every effort must be made to counteract this tendency. Information, vital to the very existence of one portion of the defense, is apt to be withheld from other portions on whom its existence depends.

Now and then we hear the cry (rarely, or never, I think, from the navy itself) that these and other anomalies should be knocked on the head by copying foreign nations, and handing over the defense of coast fortresses entirely to the navy. If our navy intended to relinquish the command of the sea, there would be some reason in copying the system of nations who will probably shut themselves into their ports in war-time; but is there any doubt that the rôle of the British navy is to shut up foreign fleets? When it ceases to do so and takes to doing land work, the end of our great empire will be within measurable distance.

The organization for coast fortress defense in these islands may be a little sick, but it seems hardly necessary to prepare for its funeral before trying cheap, simple, and common-sense remedies. Small changes in organization and an alteration in the system of command might do much, but if this fails, unification of the various branches into a coast defense corps would, without doubt, bring about the "efficient combination of many and various parts for a common end."

This lecture deals with the practice of one of these separate branches; one which, so far, only deals with guns and aerial torpedoes. A fair definition of the goal of coast gunners is given in the new "Garrison Artillery Manual":—

"The sole test of a perfect artillery organization is the power exhibited by the defenders of any unit, whether section, fort, group, or single gun, to direct on an indicated target, at the shortest possible notice, a rapid, ac-

curate, and effective fire, and to maintain that fire until its object is secured." Let us see what approach has been made to this ideal.

Probably no portion of the British army has, by internal change of method and organization, during the past decade, taken so close an approach to a new departure, or made so remarkable an advance in its preparation for war, as the coast artillery. It is the only arm which has pushed itself markedly in advance of the corresponding branch of other nations, while it has derived less help from their methods. More than any other it has tackled the difficult problem of utilizing but partially trained militia and volunteers to the best advantage. It has depended little on the pomp and glitter of parade; indeed, it was not until coast artillery were relieved from battalion drill and ceased (as infantry) to swell the ranks on show parades, that any real advance in their own profession was possible. During a whole century they realized the impossibility of their being made both first-class artillerymen and tip-top infantry soldiers. Coast artillery has, in fact, pushed its way on, with great determination, in the face of many disadvantages. It has never had, and from the nature of things never will have the newest possible armament: this is rightly given to our first line of attack—the navy; but it may fairly claim to have developed new beauties out of old weapons, and to have enabled these to hold their own with the new.

Coast artillery has never been made an attractive service; though its work is often extremely interesting to its votaries. Its doings are little seen and never rewarded. No honors, titles, or promotion, out of the ordinary run, fall to the lot of the coast artilleryman, while blame and censure are always before him. No clear range can be secured for his shooting, as is the case with other arms; and all ranks go to their practice from day to day with a heavy responsibility on their shoulders. If, after hours of weary waiting for a clear range, any link in an extensive chain chances to give way and an accident, or anything near an accident occurs, the British public cries loudly for a victim, and the coast artilleryman is apt to be offered up. He has had, in the past, little or nothing to do with the position in which his guns are placed; but if, owing to faulty position, he chances unwittingly to bombard ships or adjacent or opposite land, his is the meed of blame.

The trials of the coast artilleryman are not enumerated merely to suggest that he is an ill-used being, but to show that his merit is great in that, in spite of disadvantages which would have discouraged less sterling metal, he has brought his arm into a condition of efficient organization; and that this satisfactory result would probably never have been attained but for the practice which he has been compelled to carry out under conditions which, unlike those of other arms, impose a heavy load of responsibility, even during peace, on the shoulders of its leaders. "Necessity is the mother of invention," and the necessity of some working organization has been impressed on the minds of coast artillery by the risks they run during peace practice. They have produced the necessary system. There is no pretence that it is perfect, but it is workable.

If you will excuse the use of the personal pronoun for a brief space for convenience in relation, a short personal retrospect may help to bring home

more forcibly the difference between coast artillery practice of the present day and that of ten years ago.

In 1883, circumstances necessitated my exchanging from field artillery, and I was given the command of the artillery sub-district which contained the Spithead sea forts. Several years had elapsed since I had been a garrison gunner, and I made up my mind to resume the study of coast artillery work as a humble learner. I soon found, however, that there was little new to learn. The one thing my officers looked forward to was a change into the then more favored branches of their corps. Armaments had got a little heavier, but, in their use, there was no advance. Ammunition was stowed anyhow, unsorted; that is to say, cartridges with quite different shooting powers were mixed up in the same magazine, and shells of the same nature, but of different shapes and sizes, were placed together for use. Guns in casemates were still laid over sights both for elevation and direction. No practical means were provided for the commanding officer to enable him to ascertain the direction in which any given gun could fire. Range-finding was both slow and uncertain. Nothing was provided to enable orders, direction of targets, ranges, etc., to be passed from the top of the fort, or other place where a target could be seen, to the guns in the gun floors; or instructions to the magazine floors, except some miserable speaking tubes, the use of which irritated everybody who had to deal with them, or the alternative use of a large proportion of the available force as orderlies on ladders, to pass the word from mouth to mouth during all the noise of firing, hammering of levers, and shouting of executive words of command, which was then part of the drill. With communications in a mere single fort in so defective a condition it will readily be conceived that I could exercise absolutely no control in action over the other four forts, for whose doings I was supposed to be answerable, and no combination between these was possible. This, at the time, did not much concern me or attract serious attention, as the whole of the men of my division, supplemented by all the force I could borrow from a brother lieutenant-colonel, were not sufficient to man completely one of my forts. Militia and volunteers were not utilized as they are now.

The mere gun drill of individual guns was very good; but this, the elements of gunnery, and the moving of guns, were nearly all that was taught. Stationary targets, generally barrels with a flag on them, were alone provided; and moving targets, except when these chanced to drift, were not recognized. An old tug, only partly at my disposal, was the sole means of transporting my troops to the forts, or of enabling the forts to be visited.

Very soon after I had taken up my command, I was ordered to carry out what is called "station practice," a most wise and useful expenditure of ammunition, which consists in firing three rounds from every heavy gun which can be safely fired, every two years, to test the working of guns, mountings, and the fittings of the forts generally.

I shall never forget the experiences of that day!

The usual barrels were moored as targets. I could easily distinguish them from the top of the fort, where, as nothing was laid down for my guidance, I took my station; I soon found, practically, that they were not as easily

seen from the guns. After much speaking through tubes and sending verbal and written messages, it was reported that certain guns could bear on one of the targets which I had endeavored to indicate, and of which I had given the range. Word was passed that the guns were loaded with Palliser shot, and as soon as I saw that the range was perfectly clear in the direction of the indicated target, the order was conveyed through the speaking tube to fire. After what seemed to me a long delay (caused by passing the order), a gun went off. To my horror I saw the huge shot going wide of the mark in the direction of a buoy, not very far from which were some boats. It pitched, fortunately, over the buoy and well clear of the boats. There were recriminations, but owing to want of real organization it was difficult to justly affix the blame. The buoy instead of the barrel had been aimed at.

After a long delay, I was able to point out the targets from the guns themselves; their bearings on the traversing areas were marked, and practice recommenced.

Later on a man-of-war came along from behind. When I considered that she was nearly within the limits of danger, I sent down messages to stop firing. Owing to the length of time occupied in conveying the order, just as she was passing fairly close to the fort, a 38-ton gun loaded with shrapnel was fired. The shell burst at the muzzle, the sea was churned with splinters, etc., and I looked anxiously in the direction of the ship. I could see the people on the bridge come to the side and look towards the fort; and I also saw one large fragment going high in their direction. Fortunately for me it fell well over the ship, and nobody on board seems to have been looking that way, or I should have heard more about it.

After this day's experience I saw that my commission, and even my liberty, was not worth a day's purchase unless I devised some system, which did not then exist, to enable me to control the fire of guns and carry out practice with safety. I have labored almost continuously at the task ever since, in the fullest sympathy with officers who are called on to assume the responsibilities of heavy gun practice, but I have found it very difficult to bring home the necessities of the situation to those who have never had to assume these responsibilities of fire from elaborate forts into a crowded seaway.

Organization, other than that in pure drill, was non-existent in 1883.

Contrast this condition of affairs with the organization of coast artillery which existed two or three years ago at Plymouth. I mention this somewhat antique date because since then a change in the sequence of command has been made.

This fortress was divided into three sections, two of which had to do with the sea front; and it is only with the latter that we have to deal.

Each of these sections had a C. R. A., a lieutenant-colonel, who was responsible for, and with a very little better means would have been actually capable of, controlling the fire of any group of a very large number of guns, mounted in many forts, dispersed over some miles of sea coast. With well trained subordinates it was, however, quite unnecessary for him to exercise so elaborate a control. His function was preferably to assist, and not to worry, those engaged in practice, by using his head as one free from details,

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watching the course of events, interfering as little as possible when all was going well, but with full powers and opportunities of checking wild fire or of indicating any action he thought advisable, particularly with reference to causing the fire of forts to support each other. He could, in fact, switch fire in any direction he thought best.

He was supposed to have a station, covered in, and supplied with charts and various appliances, from which he could observe all the water commanded by his guns, and indicate exactly what he wanted them to do, but only in one case was this nearly arrived at; while it is evident that in any section comprising many miles of coast line there must be cases in which the forts will see their targets sooner and better than a sectional C. R. A. can hope to do—an additional reason why he should be chary of interference. Unless great tact is used, a long line of wire is but a poor prop for discipline to rest against.

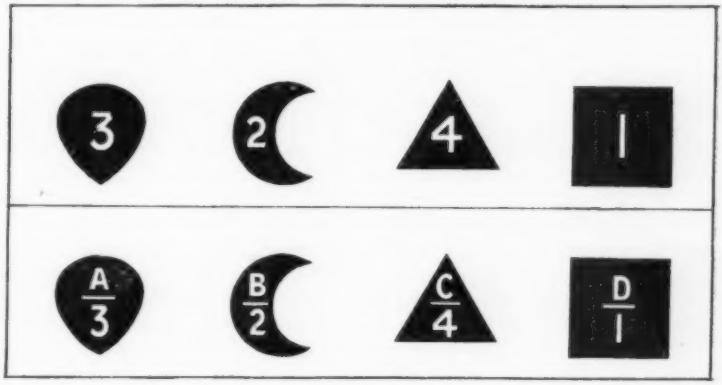
The immediate subordinates of the section C. R. A. were his fort commanders. Each of these had the entire command of a fort or battery of guns, and was responsible to the section C. R. A. for fighting that fort to the best advantage. He, too, was supposed to have a station in, or as near as possible to, his fort, with range- or position-finders, however far away, in easy communication with him, worked by his staff under his direction. Good communications with every part of his command were very necessary, but were seldom forthcoming, and generally temporary expedients were rigged up by, and too often at the expense of, the artillery themselves. If any one of his appliances broke down, the fort commander was on the spot, and could take up any means available of continuing fire to the best advantage. Thus at target practice the position-finders were sometimes put out of action, and the fort commander, without much delay, continued fire with depression range-finders. He was deprived of these in turn, and of his communications, and repaired to the gun floors, when he was in no worse a position than was a C. O. in 1884. A fort commander, with the aid of his staff, had to watch his target, indicate it to his groups, judge its speed, range his guns, and, having a far less area of sea to deal with, go into fighting details to a much closer extent than the C. R. A. of the section.

In large forts the fort commander had the next senior officer or officers to assist him, to be ready to take his place in the event of accident, or to temporarily occupy his station if he chose to visit any portion of his command. They were called sub-commanders, and he generally employed them as his substitutes during target practice, on the gun floors of casemates, or in the more distant parts of large open forts, to prevent any friction between lesser units and to see that the range was clear, which can only be decided with safety from the neighborhood of the guns.

The guns were divided into groups, each generally consisting of four or less guns, and forming a subaltern's command. Each subaltern thus became the "group officer."

Each group was numbered in succession from the proper right of the fort and had a symbol, easily seen at a distance and in comparative darkness, consisting of a figure, the number of points on which indicated the group number. Everything connected with this group that was peculiar to

it was marked with this symbol, so that the most untrained artilleryman, if he once knew the form of his symbol or its number, could hardly help finding his way in the most complicated fort. Militia and volunteer artillery were taught these symbols in their drill sheds.



Unfortunately this simple system of group symbols has been complicated by adding letters as well as numbers to the groups. And this has lately nearly led to accident at practice. The groups instead of being numbered from the right, from 1 upwards, are now lettered A, B, C, D, etc., but there is a great similarity of sound in B and D, and mistakes are made, while the form of symbol has no reference to the letter.

As it matters little as regards safety if a mistake is made in the sequence of guns in groups, probably the best arrangement would be to revert to numbering the groups and to letter the guns.

Every gun had one or more trained layers, and laying was enormously simplified by these men having to perform but one operation, viz., to lay correctly for line, elevation being given by clinometer or arc on which ranges were marked.

Each gun was commanded by a No. 1 or gun captain, who was responsible to his group officer for its correct service.

The officer in charge of magazines was, or should have been, in direct communication with the fort commander, so that, in the event of the guns being short of supply, the latter could adjust the matter on complaint being made; again, avoiding friction between units. The fort commander could give him early and direct intimation of what nature of projectile he proposed firing, or of any change, so that he could prepare for and prevent any delay in ammunition service.

Each fort had a small permanent staff, under a master gunner or acting master gunner, quite independent of the troops allotted to it, who knew all about its working and stores, and was answerable that these were kept complete and in working order.

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Somewhere in or near each fort or place of landing, a place of parade was carefully arranged, with group symbols and the number of officers and men required for each particular duty painted up, room being allowed for the troops to fall in opposite to these, while, close to the actual stations of the various units, arm racks were provided, in which each man on reaching his station deposited his arms and accoutrements in such order that they could readily be snatched up in the event of surprise on the land side.

Even had a body of undisciplined recruits arrived, it was possible to marshal them in a few minutes, while, by the aid of the symbols they would have found their exact places in action, and all without reference to a paper. These marked parades were found very advantageous in manning at night. It was quite easy to ascertain whether any man was missing from his place, and confusion was avoided.

The evidence taken before the Board of Trade Committee on target practice seaward (of which I chanced to be a member) tended to show that the coast artillery have nowhere a more difficult range to deal with than at Plymouth. It is frequently crowded with boats, and advantage has to be instantly taken of every chance which offers of a clear space for fire. Under such difficult conditions it was almost a certainty that a system developed at Plymouth would prove the most practical. The coast artillery there could not afford to toy with abstract theories in the face of real danger.

Volunteers in large numbers were assembled in the fortress by brigades for a week's training. Most of these had never even seen guns similar to those they found in the forts, though they had learnt the elements of drill with old pattern guns in their drill sheds. They were trained for five working days, and on the sixth were committed to practice; the sectional C. R. A.'s at first in fear and trembling, but, as confidence in the working of the system developed, at last boldly, trusting them to fire at towed moving targets, from several forts combined, in this difficult water area. They did so without accident, and made at times excellent practice, a result absolutely incompatible with the conditions which existed in 1884.

Existing Conditions of Target Practice.—The conditions under which target practice is at present carried out differ apparently only in name from the system last described, but, in reality, a somewhat vital alteration in the chain of responsibility is involved, which may lead to danger at target practice, and will certainly delay coast artillery from attaining the ideal organization laid down for them in their Manual.

New officials have been created, and the chain of responsibility has been lengthened but not strengthened. The first of these are "battery officers." These are expressly said to have no fire control, no fire direction. They are not to interfere with group officers firing, nor with ammunition officers; are not to concern themselves with the target nor with the order or rate of fire. It is possible a battery officer of an active and energetic disposition may, with the best intentions, seriously impede work, for lack of something else to do.

The "fort commander" is abolished, and the new creation is a "fire commander." It is laid down that "he exercises fire direction over one or more forts" (which approaches the duties of the section C. R. A.), and that

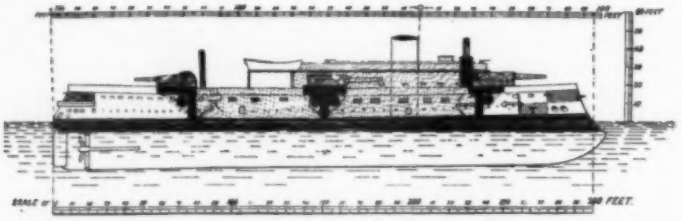
he may be assisted in the duty by one or more sub-commanders having fire direction under him.

There is a converse which appears to have escaped notice, viz., that there are instances under this system where one fort will be burdened with two or more fire commanders. As they will probably be each some long distance away, forts so circumstanced will have sub-commanders. Will two sub-commanders, under two separate fire commanders, at the same fort, be likely to strengthen discipline and add to the facility and safety of practice? On the other hand, if there is only one sub-commander, will he not have rather a rough time of it between two superior officers? Communications are very delicate, and the temptation to find them out of order would prove sometimes too strong. Possibly with experienced and well-disciplined troops it may work for a time, but the large majority of those who work our forts cannot be so described.

On the test board of an electrical system, each key added increases resistance to a current which flows best where no keys are interposed. So it is with the current of discipline. A commanding officer should be placed as close to his troops as circumstances will permit; they will fight best when he, who can praise and recommend them for reward, witnesses their deeds. Placing a commanding officer at a great distance from his troops, and adding officers to filter his orders through, adds to the difficulty of fixing responsibility in the event of accident, or faulty shooting, at target practice, which is a valuable test of good discipline. Fire commanders, if far away, will find the control of partially trained artillery more difficult, for they will not be able to visit them, and danger and anxiety at target practice will ensue.

Quite lately, however, a great concession with regard to the use of position-finding instruments has been made to the coast artillery gunner, and it is now recognized that he may use them as he uses a depression range-finder, which, though it has always been comparatively very badly found, has hitherto, from its simplicity, and from the rapidity, accuracy, and safety of the practice carried on with its assistance, always been a favorite with coast artillery, though they have never been supplied with a sufficiency of these instruments to enable them to fire at more than one of two targets, even though 8 or 10 groups were in action. This concession will have far farther-reaching results than is generally recognized. One position-finder has usually to work a few guns grouped together. Group firing by prediction—in which the position-finding operator predicts a point which a target will cross, sets his telescope on that point, sends down automatically the necessary elevation and bearing to the group of guns, and fires them by electricity if the target comes on the guessed spot—has been well described as a "method of insuring inaccuracy of fire," for the guns either fired parallel to each other (though they might really be further apart than the ship or target is long), or their fire was concentrated for one particular range, when displacement and other causes of inaccuracy were involved, unless each gun had a position-finder to itself, an alternative complicated in working and expensive both in men and stores. With the position-finder worked as a predictor, it was useless to attempt the destruction of a given portion of a ship. Coast artillery are now within measurable distance of having it in

their power to do so, and, thanks to the labors of Captain Orde Brown, they will soon have the chance given them of selecting not only a particular ship as a target, but the most vulnerable part of that ship, and of pouring on to that portion a hail of concentrated, as opposed to a slow dispersed, fire.



Here is a diagram of a war vessel taken, with no attempt at accuracy, from "Brassey's Naval Annual," but shaded with red, and with still deeper red spots, representing favorable places for attack in proportion to the intensity of the coloring. An officer, responsible for fire direction, can choose at a glance which section of the ship offers him a chance of doing the most damage, according to the quality of his guns, and he has the power of so ordering deflection and elevation that, while the layers continue steadily to lay at stem, stern, or funnel, at his will, he has a good chance, when once his guns are ranged, of pouring all his fire into that section. This was formerly impossible.

Predicted firing is slow and uncertain. Steamers towing targets at no great pace sometimes make several long runs without a shot being fired when *real* accuracy is sought. It is an advantage, of course, to have the power of prediction, especially for low-range, high-angle fire, and in the very rare instances in which smoke interferes with correct laying for line from the gun and does not interfere with the position-finder; in fact, in cases where the guns cannot see their target and the position-finder can; but, as our science advances, smokeless powder will be more and more used, and the necessity for placing position-finders far away from the guns they aid will be removed.

These illustrations are perhaps sufficient to show the advance made in, and the existing state of, fire discipline and in practical methods of rapidly bringing semi-trained troops into the fighting line of coast artillery; what is urgently wanted, both in organization and stores, to enable coast fortress defense to approach nearer perfection, remains to be pointed out.

1. In organization; the various branches of defense need placing under one head in each fortress, not merely on paper, but for constant practice during peace. Without such practice it is impossible that they can work together on the outbreak of war, and the defense will be divided against itself. Unification is imperative. Its absence has already led coast artillery to almost ignore mine defense, guard-boat defense, and moving torpedo defense, though none of these can exist without gun protection.

Next it would be most advantageous to each separate fortress if it knew what was being done to advance the common cause in other fortresses and on the experimental ground. Coast artillery has lost much by the abolition of the inspector-general of artillery, whose inspections, when he understood that branch, conveyed useful hints, kept them up to the mark, and prevented useless deviations from the path of true advance. Experience then points to the advantage of the appointment of an inspector-general of coast defense whose general experience of many fortresses should be of the greatest value to each commandant. Such an appointment would tend to apportion the comparative value of each branch of defense, and lead to the money of the nation being sensibly spent.

As regards coast artillery practice taken by itself, the following appear to be the present chief wants:—

Men and stores must be transported rapidly to and from the forts, and targets need towing at a pace somewhat corresponding to that of modern ships. Such steamers are still needed everywhere. It is highly probable that if coast artillery are enabled to practice at really fast moving targets, very much will be learnt, disputed points will be cleared up, theories will disappear, and many fallacies will be exposed.

The term "communications" has been frequently used. It covers a multitude. The perils of peace artillery practice show clearly enough that every section C. R. A. in coast defense should be able to receive and send messages by night and day without confusion, both from and to those above him, and his adjoining C. R. A.'s, and to his fort commanders. Unlike field warfare, there is no difficulty in the matter, for fixed stations are operated from. This necessity is most rapidly and surely met by telegraphs, and it has lately been suggested by more than one able coast artillery officer that the best form would be a printing telegraph. There could then be no mistake. Telephones are slow, irritating, uncertain, and inaccurate, especially during firing. It is still more necessary that the fort commander should have rapid and unmistakable means of sending, at any rate, some orders, and getting back intimation of their correct receipt. It is, for instance, of vital importance in peace practice that he should be able to countermand an order to fire. A case occurred where militia were manning a large fort, some groups of which were casemated, when a fort commander, believing he had his groups in hand, sent an order to fire by "Groups from the right." He had no sooner done so than circumstances led him to countermand the order. Bugles, telephones, etc., announced his determination, but without effect. The casemates had wooden floors and were exceedingly noisy, and nothing could be heard; group after group, once committed to action, continued to fire until hastily despatched messengers reached them.

A remedy for this would be communication in the form of electric bells over every gun, started by the fort commander, and arranged to continue ringing until switched off by the gun captain, who would at once order "Stand fast," and report to his group officer.

Order dials are sometimes suggested, and have been used, but they are not satisfactory. Passing orders from mouth to mouth is worse. The changes of elevation and direction from the existing elaborate position-

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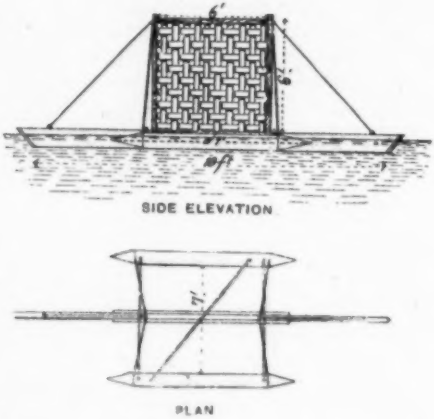
finder dials, which entail the use of a large trained staff, are a source of noise, confusion, and error, which tend to keep fort commanders in a state of anxiety. If dials are used they should be extremely simple, easily worked, and close under the eyes of the men who have to comply with the order they convey, nor is there probably much difficulty in meeting these conditions.

The question of targets for coast artillery is one of far more importance than is generally realized. While mere anchored barrels and targets of that kind were the only articles made available, coast artillery practice never soared above sight-laying and the service of individual guns. Such targets teach no tactics. If they are visible they offer few of the difficulties a layer would experience in firing at ships, and but little practice in picking up a range. As often as not when they are knocked over it is by a shot which is more or less abnormal to the rest of the practice. Shooting at such marks

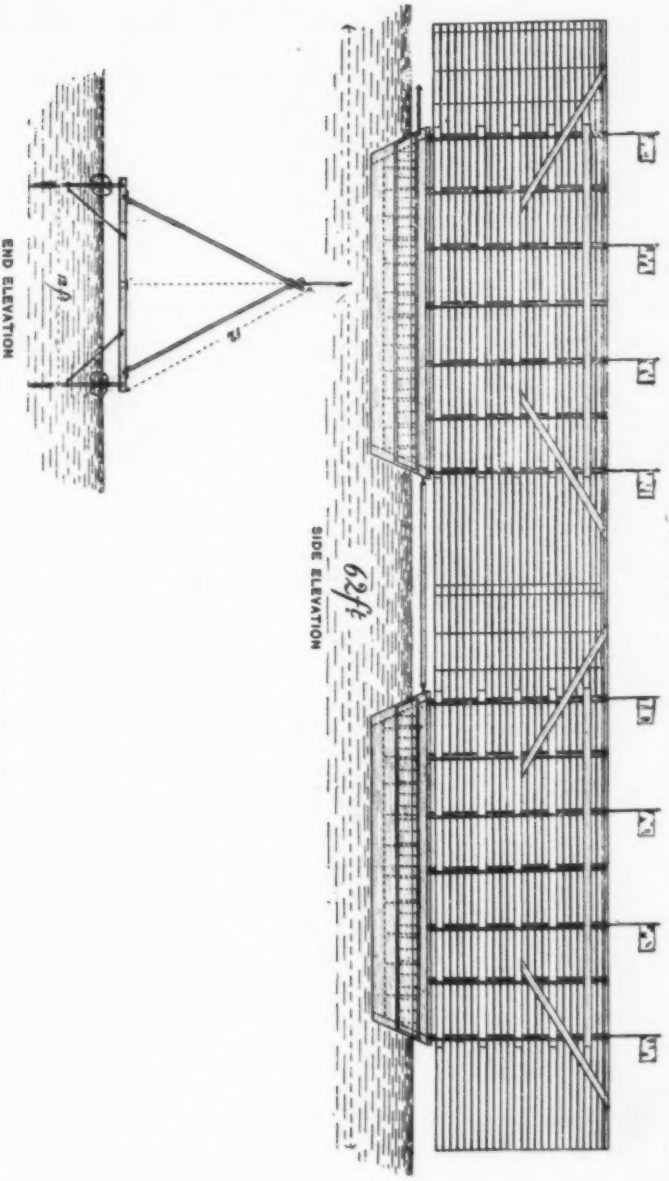
FIG. 4.

HONG KONG.

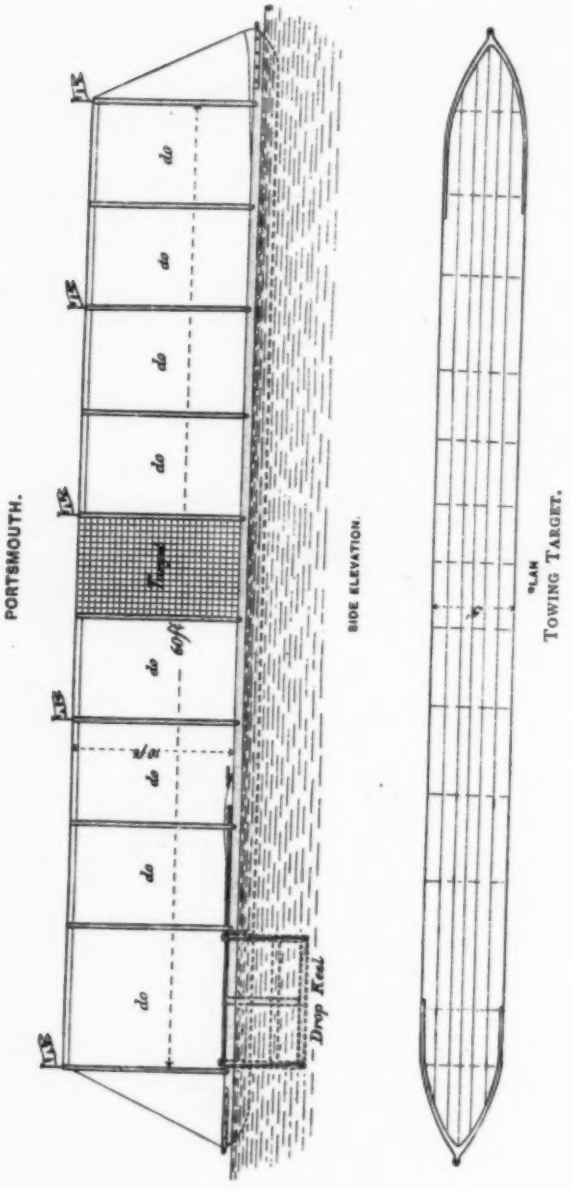


led to slow work and a feeling that luck had more to do with results than brilliant training and good work.

Shooting at more or less imaginary targets, as, for instance, towing some small target and building up, in fancy, a ship round it, has been tried (Fig. 4, and Hong Kong). It is very cheap, but is but a shade in advance, and has delayed progress. Nearly everything is guesswork. Somebody in the fort, often not exactly behind the guns, guessed the line, and the range officers guessed the unders and overs, sometimes aided by rude instruments. The results of all these guesses were tabulated, the angle of the falling shot calculated, and the whole referred to diagrams, resulting, without much trouble, in the whole of the shot striking an imaginary battle-ship; yet our practice at record targets, where each shot has really to make its mark, hardly bears out the beautiful accuracy of this class of shooting. The target, a comparatively small point when seen over the sights, is easy to lay on.

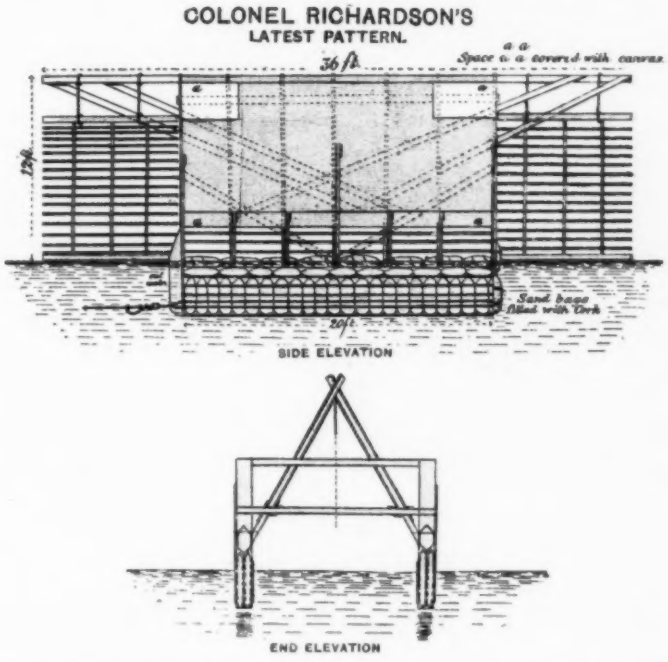


TOWING TARGET.


PORTSMOUTH.
do
do
do
do
Target
do
60ft
W/s
do
do
do
Drop Keel
SIDE ELEVATION.
PLAN
TOWING TARGET.

It is really the point fired at, but for the purpose of these calculations was generally transferred to the centre of the imaginary ship, a method which especially suited the dispersed fire of the position-finding system. Unders and overs, shots ahead and shots astern, alike counted as hits, the positive impossibility of laying at the real centre of a ship being ignored.

The diagrams show the comparative size of most of the targets which have been used for towing, except one large, clumsy, and expensive structure, which was used at Plymouth long ago, and which was the first attempt at a large target. All the large "record" targets (so termed because each hit leaves its record on them) are, somewhat unfortunately for me, after my de-



signs. Thoroughly convinced of the gain which would accrue to coast artillery from firing at rapidly moving large record targets, I have spent time and money in successive attempts to produce one. It has been uphill and thankless work. Here is a model of the latest which has been made. It seems to offer less resistance to towing, and has answered well in several trials to which it has been subjected. It costs about £13 when of the size of 36 feet by 12 feet, and is very simple to repair. The original has received an immense amount of punishment and is still as serviceable as ever.

All these "record" targets merely tow behind a steamer, which, for considerations of safety, can only move more or less *across* the front of a bat-

tery. None have as yet attained a high towing speed, though this one promises it. No steamer has been available for towing it fast.

Targets are much wanted which will advance and recede rapidly from the batteries. It is quite easy to produce targets, actuated by the wind, which will do this, but if made of anything solid and left to move free they are said to be dangerous to navigation, and would be objected to. I endeavored to produce a target made of large india-rubber balls, but the price was prohibitive and the wind acted singularly little on them. With a wind registered at 20 miles per hour blowing off shore, a thin india-rubber bladder (such as children play with), about 10 inches in diameter, though it seemed to displace an exceedingly small amount of water, travelled for 1200 yards at the insignificant rate of 2 miles per hour, its progress being recorded by taking its range every half minute with a depression range-finder. Only a very limited trial has, however, been yet made of these, and probably this is the direction which is most promising.

Nothing short of a battle-ship is a perfect target for heavy coast guns, but these cost half a million, and it is doubtful if they will make themselves targets, even in war-time, if coast artillery are really well prepared. In the hope, however, that the publicity this Institution gives to lectures will induce some one to come forward and relieve me of a self-imposed but costly task, the conditions which large targets should fulfill are appended.

TOWING TARGETS.

(*a*) A towing target must not present a less area than the probable vertical rectangle of guns fired in groups under service conditions with a practical maximum of correct service, but the larger the better if it fulfills other conditions.

(*b*) Must offer little resistance to towing when moving at a good pace, say, from 7 to 12 knots per hour with a tow-rope of not less than 300 yards.

(*c*) Must be inexpensive, as it may be destroyed by exceptionally accurate fire.

(*d*) Must be capable of easy, rapid, and inexpensive repair.

(*e*) Must be capable of being towed in reasonably rough and stormy weather.

(*f*) Should be a "record" target, *i. e.*, should register all hits.

(*g*) Must show a water-line of somewhat the same nature as that given by a ship.

(*h*) Should admit of something being carried away by each shot, so that a range party in the towing vessel may know when it is struck.

(*i*) Should have some beam, so as to equalize to some extent the conditions of fire from high- and low-site batteries.

OTHER MOVING TARGETS.

A target which is capable of moving either towards, from, or across the line of fire is a desideratum. There is, however, little objection to one target for moving in and out, and another for towing across. Unless easily dirigible, these must not be solid or dangerous to navigation.

A smaller target, representing a torpedo-boat, capable of very rapid

movement, is also much needed. It should be capable of being worked both by day and by night.

At many of our large fortresses the form of attack coast gunners have the greatest difficulty in meeting is the modern equivalent of the old cutting-out expeditions, viz., attack, by small squadrons of torpedo-boats, on the shipping covered by their guns. To produce a good defense, practice at very rapidly moving targets, which sit low in the water, is very desirable.

Navies have elected to meet torpedo-boat attack chiefly by quick-firing gun fire, and coast fortresses appear to be following the lead without trial; but the result of all-round fire of this nature on other ships of the same squadron has not, perhaps, been sufficiently considered. In many of our coast fortresses it is, at any rate, probable that free shooting into the opposite forts and shores will be seriously objected to. Opportunities of practice at targets somewhat resembling torpedo-boats in size and speed may lead to the discovery that small quick-firing guns are not the most suitable weapons to meet torpedo raids.

When shooting big game with great vital powers, large bores and heavy bullets are used. Small game is far more easily disposed of by fairly large bores and small shot, while the danger to outsiders is minimized; and the analogy may hold good in coast artillery practice, but without real practice at good representative targets, everything is wrapped in theory and doubt, and coast artillery cannot solve the question as satisfactorily as they have met the altered conditions with regard to battle-ships.

Again, if such a target is made available for coast artillery, they will be in a position to solve another problem, which is at present in a backward state of solution, namely, how gun defense in all its branches is to be made as effective by night as by day. The way in which the water area commanded by the guns is to be lighted at night and in damp weather, with smoke hanging, has not, so far, been placed in the hands of coast artillery to deal with, though it so intimately concerns their efficiency. Even the electric lights they now work by are run by another branch of the defense, in their own fashion, an additional instance of the need for unification. When really rapid targets come into use it is more than probable that, better recognizing the difficulties with which they have to contend, artillery will demand better methods of application of the electric light itself for their own purposes, or even abandon it altogether in cases where the configuration of the shore admits of the use of a better light for showing up torpedo-boats, etc.

In the near future, arrangements will have to be made to produce targets for practice with high explosives, but these present little difficulty. There is no reason, as far as the range for peace practice is concerned, that there should be more danger to be apprehended from such projectiles than at existing practice. The shells go into very small bits, and these do not range anything like as far as the ricochets of the projectiles now fired. If the shells do not burst in the gun or at the muzzle, they will not burst until they reach the end of their flight.

The practice of coast artillery is enormously influenced in its quality by the way its guns are placed and mounted. Gunners endeavor to make

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themselves responsible for the efficient gun defense of their fortress, but their difficulties are increased by the forts, batteries, and gun sites being designed and placed by others. Defense would be very much strengthened, probably at a considerably reduced outlay, if the position and style of mounting of guns were largely influenced by coast artillerymen; and the same may be said of the position and construction of range-finding cells and lights. Peace practice often affords an excellent practical test of the wisdom expended in choosing sites. If guns are placed in bad positions, and are ill-mounted for the work they have to do, danger at practice almost always results. Guns that would do more harm to friend than to foe in war-time had better not be mounted. It would be perfectly easy to test sites by target practice before expending large sums in permanent emplacements and batteries; and the real defense of fortresses would be enormously improved, while coast artillery would not be troubled with the work of forts in the practical value of which they do not believe.

The very great caution used by coast artillery during target practice is evidenced by the fact that, though some 63,000 rounds are annually fired seawards at targets by Royal Artillery, militia and volunteers (excluding Shoeburyness), up to the date at which the Target Practice Committee commenced sitting, only eleven complaints of accidents, or approximation to accidents, had reached the War Office since 1864, a period of twenty-eight years, while in only one of these cases was any injury done to anybody, when artillery, firing from Plymouth Citadel, in 1864, with old smooth-bore guns, struck a boat, after which a shell had made several ricochets, and unfortunately killed a man.

But though these are the only officially recorded cases, there have no doubt been instances where projectiles have gone a great deal closer to boats than the officers in charge of practice liked; and still more frequent instances in which, though no danger to vessels or boats ensued, projectiles have not pursued a course intended by the commander of the practice, either from his orders not being correctly conveyed; from mistakes, most frequently caused by too great reliance on the use of instruments; by long and weary delays; by commanders themselves not having experience of the work; or, in the vast majority of instances, by the uncertainty of ricochet.

Coast artillery practice would be generally simple and safe were it not for that scourge of the coast gunner—ricochet, which is responsible for nearly all the mishaps which have from time to time brought the artillery into trouble.

Shell fired from guns *ought*, theoretically, on striking a plane surface to ricochet to the right, unless they strike at such a falling angle as not to ricochet at all; and inexperienced (and even experienced) officers at times have trusted too much to this theory, and judged that the target was safe for practice when they saw that the line of fire and all to the right of it was clear. But the surface of the sea is hardly ever a plane surface, and what are called abnormal ricochets, though they are strictly in accordance with natural laws, occur. Every now and then a shell striking a wave flies to the left. There is no possibility of telling when this may occur, but it happens most frequently in rough weather.

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No witness who appeared before the Committee offered any practical suggestion for minimizing ricochet—the greatest source of danger in target practice; yet the matter is fairly simple, and from its importance, not only to the increased safety of target practice, but as a solution of the difficult question of the defense of land-locked channels by gun fire, in which at present friend and foe are involved in equal destruction, it is very much to be desired that attention should be drawn to it. It will be only one more of the many additions to practical defense which have been brought out by target practice.

It is known to many artillerymen that flatheaded projectiles ricochet but little, and it is probable that a slightly recessed head would ricochet even less, while those of the service shape ricochet more freely, or as freely, as any. Projectiles for fort guns in locked-in situations, and especially those on high sites, would be as effective as at present, and in some cases more so, if they were made with non-ricochet heads, while many forts which cannot now practise their armaments and their personnel could and would be far more ready for war if made available for target practice. It has also been suggested that coast artillery should do as the navy do, and practise with reduced charges. This may be practicable with B. L. guns not on disappearing mountings, and where recoil is a matter of no moment. The naval mountings for the most part differ from land service mountings. In the latter, and especially in muzzle-loading gun mountings, the rapid service of the guns depends largely on a full recoil.

But ricochet is undoubtedly greatly reduced by using reduced charges. The following table just received from Lieut.-Colonel Rainsford-Hannay shows the different angles of descent with full and reduced charges from a 9-in. R. M. L.:—

Range yds.	Angle of descent.	
	Full charge.	Reduced charge, 33 lbs.
2,000	3° 45′	6° 8′
2,200	4 17	7 8
2,500	5 7	8 37
2,700	5 41	9 42
3,000	6 35	11 11

With an angle of descent of 10° there is generally no ricochet from water. It is impossible for any inspecting officer to be sure that forts, guns, and mountings are really in an efficient condition, however close his inspection, without firing with ammunition such as would be used on service; and experience shows that practice, and practice alone, under conditions which resemble what may be expected in war, can insure perfect preparedness. Perfect readiness and organization are what coast artillery attempt, and the nearer these are attained the more it becomes certain that the fortresses, of whose defenses they are the first line, will never be attacked from the sea by ships.

CAVALRY IN FUTURE WAR.

By Colonel VON WALTHOFEN (of the Austrian Army).

Translated by Captain W. C. Rawolle, 2d Cavalry.

THE views of the present concerning the general (strategic) and special (tactical) value of cavalry, as well as of the effectiveness of its action and manner of employment in the future are decidedly more divergent than those respecting the other arms of the service. By comparing the articles which have appeared during the past ten years in military journals and also in the weekly and the daily press, colored generally according to the bias of the author, one cannot but be surprised and even astonished at the very contradictory views advanced concerning this very important subject, while in some instances the advocates of these have gone so far as to make them the basis for the most remarkable assertions and deductions. All this is principally due to an attempted comparison between the famous victories won by cavalry in former epochs, especially those during the three Silesian wars of the last century, and the limited number of cavalry attacks by large bodies of this arm in recent wars. In instituting a comparison of the kind conclusions unfavorable to the mounted arm should not be jumped at, but the apparently external differences should only be considered in connection with the conditions then existing with reference to the following factors, viz.: organization, the weapons in use, and tactical methods followed. These should be contrasted with the changed system of war in vogue now and the changed duties of the cavalry in consequence thereof.

As instances of the most striking contradictory views held in regard to this subject at present, it is only necessary to cite a "study" entitled, "La Cavalerie dans la guerre moderne," published in the September and November numbers (1889) of the popular *Revue des deux mondes*, said to have been inspired by Lieut.-Gen'l Gallifet, who indisputably ranks as the highest authority in matters pertaining to the French cavalry and justly so because of the correct opinions he advances concerning the employment of this arm in a future war, the tactics to be observed by it, the best organization adapted to times of peace and the methods of training to be followed by it. In the May number (1890) of the *Revue de Cavalerie* appeared an article as a sort of a supplement to this study in which the manner and means of carrying into effect the propositions mentioned are entered into.

Further on I will refer to the most noteworthy ideas contained in these two studies, one of which has special reference to the care of the mounted arm; I also propose to subject them to the criticism they deserve.

Views of an entirely opposite character are those announced by the author of the "Military Essays" signed by R. V., who is said to be a general officer of the Prussian army—in part I of these essays published in 1881 and entitled, "About the Value of Cavalry in Wars of the Future," and in part IV of the same, concerning "Tactics of the Separate Arms," which appeared quite recently, where he most positively asserts "that in consequence of

the brilliant traditions of the Seven Years' War the cavalry is covered with a mantle of glory, which, considering real conditions, it has not been entitled to for ever so long; that the German armies take fully 30-40,000, too much cavalry into the field with them for the purpose of making attacks which they either find it impossible to execute, or when made prove but harmful; that taking along a superfluous amount of cavalry in campaign is done at the expense of the infantry; that it delays the strategic assembly of the other arms and is a hindrance to movements generally, and finally, its presence renders the obtaining of supplies for the advancing army more difficult."

If one compares these extreme, and as I will show later on, untenable views, with those stated by General Prince Hohenlohe in his most excellent military letters, especially those contained in Vol. I. on Cavalry, which he gradually develops and bases on facts, one cannot help but express astonishment at the one-sided opinions and statements of an officer of experience who gives them publicity with all seriousness and at the same time presents them to the military reader in the most plausible manner.

Even if inclined to ignore the various articles on "Modern Cavalry," which have at odd times appeared in the daily press and abound in erroneous statements and false deductions, since they are only intended for the general public and not heeded by those whom they should specially interest; it does not follow that the same course is to be pursued with reference to these "Military Essays," which profess to be convincing by reason of the military examples cited, and which—it is to be assumed, unknowingly—mix up truth and fiction, notwithstanding the research and (presumably) experience in war of the author whose deductions are one-sided and apt to cloud the judgment of some military readers. These essays need to be answered and refuted.

In order to arrive at a just and correct understanding of the subject it is necessary to investigate it thoroughly from its very foundation, to present statements which bear upon it from all directions, freed from any controversial spirit, citing naked facts from the most recent events of military history which will serve as a guide in determining what were the functions of cavalry during wars of the latest epoch and what they will be in the future, at the same time bearing in mind the improvements made in the weapons of the other arms of the service and also their tactical progress.

I have set myself the task of doing this in behalf of the cavalry, however, without any prejudice in its favor; it is also granted me to be impartial from the fact that I am a retired officer and can therefore not be charged with self-interest. I may add that for twenty-four years I have labored in the field of military literature, having particularly devoted myself to the special branch of the cavalry, so that I can be permitted to say, without egotism, that I am quite familiar with it in all its bearings and have learned to form unbiased judgments concerning all that is said for and against the subject. To form a proper conception of what the rôle of cavalry in future wars will consist and what duties will be required of it during the various phases of a campaign one needs to outline in general terms the probable current of events of such a war in connection with recent progress in their conduct, especially with reference to the present strategic conditions, organ-

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ization, mobilization, armament and tactical methods of the great armies of Europe. By pursuing this course—an equally imaginative one—it is possible to arrive at an understanding of the different phases of a future war and to determine quite accurately to what extent cavalry will participate and what special duties will fall to it. In this manner it will be shown clearly and definitely in what respect and to what extent the value and effectiveness of the mounted arm has been necessarily restricted at present as compared with former epochs of military history; in that way it will also be possible to determine what changes and modifications need to be made in its organization, armament, tactics and training, so that it will be equal to the demands to be made upon it in wars of the future and give opportunity of doing away with evils which in times of danger might lead to disaster.

Immediately after the issuance of the sovereign's order directing the mobilization of the army, the "Nation in arms" becomes a reality. In Germany and Austria not only the army proper, but the reserves of the 2d line (Landwehr) and the further reserve (Landsturm) can be gotten ready for active service either wholly or in part to constitute an army of operations, making a force which, compared with the armies of former wars, not even excepting that of 1870, would be far superior in point of numbers.

It will be simply impossible to handle and supply such colossal levies on a fractional part of the theatre of war with any degree of advantage compared to campaigns of the past. A separation and distribution into armies will become a necessity, depending of course upon existing political and strategic considerations as well as upon the possible points of concentration of the opponent's forces. That a power with its army completely organized would be able to surprise another whose troops are in a state of unreadiness is not to be taken into account. Considering that military service is a universal obligation, and that every detail for ordering a mobilization in all armies is prepared and in readiness for calling the troops into the field to meet any emergency, making them available for instant action, it is not likely that it would be possible to effect a partial mobilization without the enemy obtaining knowledge of the fact; this contingency may therefore be left out of account.

A partial mobilization might certainly be brought about with Russia for instance—by assigning cavalry, horse artillery and rifle battalions to the commands écheloned near its frontier and holding them in a state of readiness for the accomplishment of certain strategic tasks as soon as diplomatic relations were severed and a declaration of war had followed. However, a secret half measure of the kind would hardly escape the notice of the military authorities of the adjoining state who would understand the drift of such peace preparations and would immediately resort to appropriate counter measures so that the former would gain nothing by his scheme. General Prince Hohenlohe shows in his letters, which have already been mentioned, that adroitly planned raids to disturb the mobilizing of an army, if undertaken by a cavalry not fully organized will result in nothing, if its army is not in a complete state of mobilization, prepared to support it and ready to take the offensive.

It may therefore be stated in general, that the first step of preparation

consists in issuing the order directing the mobilization of the entire army and that in view of the present extended and rapid means of communication it is an absolute impossibility to keep such a measure secret; the opponent will consequently be in position to follow immediately with his order of mobilization. The difference in time between the preparations of the two parties will hardly amount to twenty-four hours; he who is the first in this respect may possibly gain that much the start. This advantage ought now be used by the cavalry as the rapidly moving force, assuming it to have been fully organized, to reconnoitre the enemy, to disquiet him and to proceed to such enterprises as will do him damage.

The different armies after complete mobilization having been assembled in the locality demanded by strategic considerations or in the direction of the separate theatres of operations assigned them need to be secured against surprises by the enemy; this is best accomplished by guarding and maintaining possession of all the lines of communication leading from the enemy's country to our place of assembly. An occupation in sufficient force of points commanding these lines together with uninterrupted measures for obtaining information concerning the enemy's doings are decidedly the best means for the accomplishment of this object. This duty is performed most satisfactorily by the independent cavalry divisions to which, under certain circumstances, several rifle battalions might be attached; the functions of the former would be of an offensive character (exploring and reconnoitring duty) while that of the latter of a defensive nature (security).

As soon as the army has completed its strategic concentration, operations against the hostile forces, as planned by the commanding general, are begun. In the course of their execution these will have to be protected against any unexpected blows of the enemy, and screened so as to prevent his cavalry from obtaining any information regarding them. On the other hand the necessity exists for ascertaining the strategic movements of the enemy's army or its fractions, so that the commanding general may be in position to come to correct conclusions, to adopt suitable counter-measures or to modify his plans.

To do this time and space are requisite and these two can only be gained by means of the mounted arm. To attain the end in view, that is to perform its reconnoitring and security duty with success, the cavalry, of adequate strength, will have to be thrown a sufficient distance in advance of the operating army. Since the opposing cavalry will in all probability be used for a similar purpose in front of its army, it follows that these masses will sooner or later come into collision in their endeavors to retain possession of such localities as are of advantage to them or as results of their efforts to solve the special task assigned them. This will end in a victory for one side or the other. In order then, that the defeated cavalry may not be compelled to fall back on the heads of columns of the operating army, and to their great harm, it may be advisable to push forward supports—or still better—to attach battalions of riflemen temporarily to the cavalry divisions for the occasion or to have the latter follow for the purpose of holding such points of advantage as will serve for cavalry to fall back on and to stay the pursuit of the victors. If this is not

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done, if the cavalry used for reconnoitring and security duty is driven back on the heads of columns of the army a strategic inferiority will result to that side, as was experienced by the French in 1870 to the great disadvantage of their operations. As early as this stage of the campaign it will be manifest what benefits are assured by having a sufficiently strong cavalry, one that is properly employed, efficiently and energetically led in preparing the way to strategic successes for the good of the whole. One may unhesitatingly maintain that in future that side will possess a strategic superiority whose well led and well trained bodies of cavalry will put the commanding general in position to dictate measures to his enemy or rather to be able to assume the initiative and to maintain it under all circumstances.

In a certain place of his "Military Essays" the author very justly remarks "that a single piece of important information concerning the operations and position of the enemy may exert a greater influence on a campaign than might be expected, from attacks still in the distant future." He also recognizes the difficult tasks cavalry will have to render at this stage of the war in the performance of its strategic duties necessary to the good of the army, but nevertheless expresses the opinion "that in future—as was exclusively (?) the case with the Germans in 1870—the successful performance of reconnoitring duties can only be done by officers' patrols." He bases this opinion on the assertion "that during the Franco-German war cavalry divisions as a whole never (?) performed exploring duty; that they did not prove themselves equal to breaking the resistance of infantry holding localities in their way, nor when circumstances demanded did their forced reconnaisances result in compelling the enemy to show his strength."

In reply to this it is to be observed that the strategic duties of cavalry, as now conducted, date from the most recent period of military history. We Austrians led off in this with our two light cavalry divisions in the campaign of 1866; and the Prussians followed our example after the battle of Königgrätz by sending a portion of their reserve cavalry out in front of their army. It was not until the war of 1870, however, and not till the opening of that campaign—for the strategic duty of the German cavalry in front of their entire army did not begin until the 8th of August—that one could form a picture as to what these duties in the interest of strategy would consist of in future. In this connection sight must not be lost of the fact that in the performance of this (strategic) duty, during the war of 1870, the German cavalry virtually had no opponent, for the French entirely withheld their reserve and corps cavalry; furthermore it is to be noted that the German cavalry was not armed with a long-range repeating carbine so very essential to an efficient performance of this particular function, and finally that the organization, equipment, peace-training and leadership of the German cavalry were not altogether satisfactory for the fulfillment of its strategic aims. Notwithstanding all this the German cavalry divisions during the entire campaign were most successfully and actively employed, self-reliant and generally accomplishing their undertakings.

The author of the "Military Essays" is not disposed to do justice to

the activity and successes of the German cavalry; he has an eye only for various mistakes and sins of omission on which he dwells, concerning which, however, it need only be observed that no war will ever be without them, for it is mortal to err, besides war, especially modern war is the most momentous and difficult of human affairs. He reduces the employment of cavalry to duties calling for nothing more than an observation of the enemy; it could not and cannot do more than this, says the author, "after none of the victorious battles of Wörth, Sedan, Orleans, could the cavalry—according to him—maintain touch with the defeated enemy for even a day, since a few infantrymen occupying villages or hamlets managed to delay entire divisions of cavalry and then out of considerations of safety these would have to move to the rear for the night to establish their bivouacs. An impartial critic, one who maturely considers all the facts, can have no idea of approving everything done or attempted to be done by the German cavalry during the war of 1870, nor would he be disposed to overlook the various blunders committed by it, no matter what reasons might be offered in explanation, furthermore the deeds of their cavalry in that period are not to be considered as invariable models for the future. However, to be fair and just one cannot but acknowledge the very valuable services the German cavalry rendered the army in its exploring and security duty during the war of 1870. After the battle of Wörth their cavalry divisions pushed on to the Moselle with rapidity and resolution—following of course the general instructions given them from army headquarters. By means of their forced marches from the 8th to the 13th of August they were enabled to gain a start of the enemy, preventing the latter from establishing himself in the very advantageous positions along the left bank of the Moselle; preventing him also from penetrating their screen which concealed the advance of the many German columns to the Moselle crossings above Metz. They destroyed (night of Aug. 11th-12th) telegraphic communication between Metz and Nancy and as early as the night of August 11th occupied the two very important crossings of Pont-à-Mouson and Nancy which the French failed to render impassable.

When, notwithstanding all this, the author of the "Military Essays" sets up the claim that the pursuit of the German cavalry after the victory of Wörth was not satisfactory, it need only be answered (as did General Prince Hohenlohe) that this assertion does not accord with the truth of military history. Aside from the fact that the 26 squadrons which took up the immediate pursuit on the evening of the day of battle brought in prisoners to the number of nineteen officers and 1593 men, 14 pieces of artillery and one standard, it is to be added that the 4th Cavalry division was started on the morning of the 7th for Nancy, which it reached on the 4th day, making a distance of 81 miles, having to cross the Vosges range of mountains which abounds in many difficult defiles. After securing the Moselle crossings, the work of the German cavalry was of still more important and energetic character. But the author of the "Military Essays" knows only of an omission to engage in a forced reconnaissance in the direction of Mars-la-Tour and the right wing at Gravelotte

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for the evening of August 15th, to which he gives great prominence. Of the following he makes no mention: the cavalry divisions (the 5th, 6th and Guard) knowing when crossing the Moselle they would find themselves alone within striking distance of the enemy's forces, their patrols also having established that the hilly and timbered left bank of the Moselle was held by him, they nevertheless crossed with 60 squadrons (at Pont à Mouson and Dieulouard), spreading out over his base of operations in order to obtain definite information concerning the grouping of the hostile army. The 5th Cavalry division had on August 15th pushed as far to the northward as Jarny and Rézonville, placing itself across the enemy's line of retreat, where it deliberately went into bivouac in the proximity of a French division of infantry which had been advanced to the vicinity of Thioncourt. This unexpected appearance of the cavalry created uncertainty and confusion in the opponents dispositions. Furthermore the Guard cavalry division had established as early as August 15th, that nothing was to be seen of the enemy as far as the Meuse, in consequence of which important information it was possible to order the different corps, after having crossed the Moselle to proceed northward in the direction of the enemy discovered in camp on the 15th.

The "General staff history" appreciatively records "that the conclusions at army headquarters productive of decisive results were based on the clear and reliable reports sent in by the numerous German cavalry." In all phases of the war, but especially in this, did it render the army the very greatest service and because of its intelligent, determined and successful efforts was it possible to make certain of the victories of the 16th and 18th of August.

"These results in reconnoitring duties were exclusively obtained by means of officers' patrols," says the criticising author of the "Military Essays." With this he forgets however, that the nature of intelligence duty was of an abnormal character from the fact that the enemy made no such use of his cavalry as did the Germans and it is therefore not to be considered a system to be followed. The conditions would have been materially different had the French employed their cavalry in strategic reconnaissance and security duty as the Germans did. In that event the German officers' patrols would not always, perhaps but rarely, have been able to penetrate into the French sphere of movements, covered by a screen of cavalry of adequate density, to obtain information at small expense of effort; it would have been necessary for their supporting squadrons or main bodies of the cavalry divisions to have disposed of the opposing French cavalry before they could have hoped to execute the tasks required of them.

It will depend entirely upon circumstances whether in future the obtaining of information concerning the enemy's strength and dispositions is to be done by individual officers accompanied by a few mounted orderlies as messengers, or by stronger reconnoitring patrols if this be impracticable; or again if these do not suffice on account of the dense screen formed by the enemy's cavalry and their alertness, by resort to a force of still greater magnitude, No matter what the conditions though, their reconnoitring detachments in the first line will have to enjoy the fullest freedom and

independence of action and the officers selected to command them, need to be the most intelligent, adroit and best mounted and should also be advised of so much of the strategic situation and contemplated movements as will aid them in accomplishing the objects for which they are detailed.

That the freedom of action and independence of these detachments would suffer as a general rule by the assignment of infantry, to be transported on wagons, as oddly suggested by the author of the "Military Essays," is self-evident. I know from my own experience that this sort of assistance generally proves to be more of a drag than a help.

In 1878 during the Bosnian campaign of occupation, and immediately after the engagement of Roglje (Aug. 6th) while in command of the divisional cavalry, I was ordered to proceed with 1½ squadrons from Varcar to Jaice, to occupy this stronghold, it having but just been evacuated by the enemy, and to explore towards Travnick. To a better execution of this duty a platoon of infantry on wagons was directed to accompany me. Before starting I gave the infantry officer the necessary instructions; it was my purpose to reach Jaice before dark, this place was at a distance of 19 miles, my own orders not having been received until 4 o'clock that afternoon. The first part of my instructions I could not accomplish since the old fortified town had been re-occupied by a considerable force (1200 men), the other, to obtain all possible local and strategic information, I had attended to long before the arrival of the infantry on their wagons after 10 at night. Their delay was due to the miserable condition of the roads and their indifferent teams. Notwithstanding there were but 8 men to the wagon (not 12 as is proposed by the author of the "Military Essays") they could make no better progress, it having taken them 6 hours to make the 19 miles. All the good this infantry did me was to furnish the stationary outposts, my cavalry of course patrolling and securing in front.

I have heretofore alluded to the fact that there may be occasions when it would be advisable to attach entire battalions of infantry to cavalry divisions in the performance of their strategic duties; but to have an infantry support to accompany them in wagons in the extreme advance will but rarely prove desirable.

After this digression concerning observations relating to the strategic employment of cavalry in the second stage of a campaign let us now return to our sketch of a campaign of the future.

As soon as the distance of the cavalry in advance of the marching columns is reduced to a minimum by reason of encountering opposition from the enemy or being pressed by him, it will become necessary to concentrate the various fractions of the army then moving by separate routes, or of narrowing the front over which the different columns are approaching. This is the period when the two opposing and independent forces are about to come into collision; the operations are continued but mainly in connection with petty encounters, which imperceptibly lead to the battle which develops from a series of distinct engagements and, on completion of the concentration, culminates in the preparatory stage of the battle.

The narrower the space separating the contending parties becomes, while they are mutually approaching each other in the act of delivering the

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tactical blow, the greater the need for the cavalry to prosecute its intelligence duties with energy and perseverance; at this period, more than at any other time, it may be compelled to call on the sister arms for assistance. The bodies of cavalry then, agreeably to the instruction given them, will, as a rule, retire gradually in the direction of the wings of their army, or the position to be occupied for the line of battle, from whence they can uninterruptedly continue their strategic reconnaissances and security duties on the flanks of their army now ready to begin the struggle, and at the same time make opportune efforts to operate in the enemy's rear.

Cavalry divisions should especially determine, even before the troops are set in motion for battle, the position and the limits to which the enemy's flanks extend. Division commanders are required to attend to this of their own accord, they are not to wait for further instructions in regard to the matter. The "Field-duty Regulations" emphasize, 'the obtaining of information concerning all that which transpires on the battle-field is principally their business, and for its accomplishment they will resort to a sufficient amount of force when circumstances demand." That cavalry properly organized, equipped and armed with the advantage of an efficient peace training, is capable, in spite of long range rifles and field guns, of undertaking and executing a forced reconnaissance when required, I will endeavor to prove later on. It would certainly be a sad state of affairs with the cavalry, if in situations of the kind "it could do nothing more than observe the enemy from beyond rifle range by means of officers' patrols," as is held by the author of the military essays. This range now-a-days amounts to more than 3000 paces; and what discoveries are to be made at that distance, especially in a close country, again, would the enemy's cavalry, if at all active, permit such feeble efforts at reconnaissance?

That in wars of the future, the artillery massed at close intervals and in great batteries, will open the contest can be assumed with safety, for opinions in regard to the functions of this arm in the introductory phase of a battle are universally the same; to this end the batteries are placed at the head of columns. All attacks of the principal arm—the infantry—are best prepared by the artillery, for the reason, that because of the greater range of its guns and the explosion of its projectiles it is able to enter the contest at a distance beyond rifle range and at a moment when infantry fire would not be effective; then again, by subduing the fire of the enemy's artillery, and destroying his cover, it is enabled to render the most effective assistance to the infantry.

It has already been stated that by this time the cavalry would generally have been withdrawn from the front and assigned to positions to cover the flanks and to protect the batteries. Whether, as is maintained by the author of the study in the *Revue des deux mondes*, the masses of cavalry will in future be called upon to charge and capture the enemy's guns, at least to make the effort, and to delay the advance of the enemy's infantry, it can only be said that these would be measures of doubtful advisability. It may well be possible that cavalry divisions—and occasionally the divisional and corps cavalry—will at times find opportunities for such enterprises, especially

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when the opposing cavalry is negligent about its duties and the character of the ground and general condition of the engagement would warrant undertaking them with any promise of success. However, opportunities of the kind will be but of a fleeting character, and will only be seized with profit by a most intelligent and resolute cavalry leader.

The successful frontal attacks of the Austrian cavalry, brigades of Pulz and Bujanowitz, at the opening of the battle of Custozza (15 squadrons—2400 men) on the deployed infantry divisions of Humbert and Bixio (about 26,000) over rough and cultivated ground, and in the same battle, the charge of the three platoons (about 100 men), Sicilian Uhlans, on the 5 battalions of the enemy, which resulted in a panic with four of them, so that these were of no further avail for the day, prove, as well as did the successful undertakings of the German cavalry at Vionville and Mars-la-Tour, that cavalry attacks in the first stages of a battle are by no means impossible, and will be resorted to in the future as in the past. The magnitude of the difficulties and the danger by no means equal the renown and the results cavalry will be able to reap under similar conditions.

Scherff too, in his very excellent studies, "The new tactics of infantry," expresses the opinion that there may undoubtedly be occasions "where even at the preparatory stage of a battle, it may become necessary to make use of the offensive power of large masses of cavalry, which are presumably at hand in advance of the approaching columns of the army, to take advantage of momentary opportunities. It may happen that on account of the dexterous handling of the defenders cavalry it will not be possible for the assailants artillery to produce that effect at the preparatory stage of the battle which will enable the latter to gain an insight into the defenders position so necessary to a proper development of the attack. The cavalry bodies of the assailant will then be compelled to drive back that of the opponent in order that the batteries of the former can advance sufficiently to fulfill the duties required of them. Again the reverse may happen, the assailant may open the engagement so unexpectedly and at such close proximity, before sufficient resistance can be opposed, that instant efforts will have to be made to dislodge him. A heedless management of an advance guard, or a delayed retiring of out-posts or rear-guards will present opportunities to the cavalry of both contestants for engaging in surprises which may lead to effecting the most fortunate conditions for battle—other similar situations may arise as are mentioned in recent military history."

Reasons founded on the necessity or opportunity for the effort, may therefore exist at the very introductory stage of a battle for resorting to the exceptional employment of large bodies of cavalry which are at the front and available. However this must not be done as a rule, as advised by the author of the study published in the *Revue des deux mondes*, but should be the exception, for it would involve not only a great risk but a greater responsibility to sacrifice or give out of hand at the preparatory stage of battle and without urgent need, the expensive mounted arm so essentially necessary in the closing acts of the battle drama. Here at the very beginning of the struggle it is evident how requisite it is that in battle those filling positions calling for the direction of affairs should be thoroughly familiar

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It has already been stated that by this time the cavalry would generally have been withdrawn from the front and assigned to positions to cover the flanks and to protect the batteries. Whether, as is maintained by the author of the study in the *Revue des deux mondes*, the masses of cavalry will in future be called upon to charge and capture the enemy's guns, at least to make the effort, and to delay the advance of the enemy's infantry, it can only be said that these would be measures of doubtful advisability. It may well be possible that cavalry divisions—and occasionally the divisional and corps cavalry—will at times find opportunities for such enterprises, especially

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with the art of war; it is only a cavalry leader who can rise to the importance of the situation who will understand at rare moments how to seize opportunities of launching his cavalry against the opponent in the introductory stage of the fight at the expense of such sacrifices as the good of the whole calls for.

In the second stage of the battle, which now follows, the infantry seconded by the artillery will play the important part. Owing to the fact that the infantry of all European armies will soon be armed with the magazine rifle and that the greatly increased supply of ammunition carried on the person of the soldier together with that which will be sent forward, will permit of a fire of such intensity as will simply render it impossible at this stage of the battle for large bodies of cavalry to come within the limits of the zone of fire in the expectation of accomplishing even partial results. While the attack is progressing to a tactical issue, which is particularly the business of the other two arms, the infantry and the artillery, the cavalry divisions will have nothing to do in front as long as the enemy's fire precludes any chance of a successful participation. In order to be spared any unnecessary losses they should be required to retire to a part of the field, where (dismounted) they can remain unmolested and until such time as their services may be needed, when they will be able to respond without having suffered either in morale or otherwise. In view of the long range guns and rifles of the present, the locality where large bodies of cavalry could be held in readiness without being molested would probably be at a distance of 5000 paces from the enemy. For it is a primary condition with these large masses that to attain useful ends they must have room to move and form. That the most suitable place for the large independent bodies of cavalry will generally be in rear of the extreme wings of the line of battle has already been referred to, from those positions it will be possible to make themselves felt most unpleasantly in protecting the flanks of their own troops and in discovering the movements of the enemy's second and third lines. However, by that we do not mean to say that all the cavalry divisions are invariably to be directed to the rear of the flanks. In future, as in the past, large masses of cavalry will find opportunities for doing great deeds in the very front of the battle. Aside from the fact that the ground occupied by the wings of the opponents line may prove unfavorable for the attacks of large bodies of cavalry, since he has the choice of position when on the defense; aside from the fact that failing to have mounted troops at intervals along the front of the line might prove of disadvantage, it will be desirable in many respects to have large bodies of cavalry at hand either to fill gaps (cavalry division of Edelsheim at Icin), to support long lines of batteries (as at Sedan), to prevent the opponents cavalry making sudden attacks or to silence his batteries (Berdow's brigade at Vionville), or to cover the retreat of defeated infantry across open country (dragoons of the guard at Mars-la-Tour), etc.

While modern battle tactics advocate flank attacks and also the strategic enveloping of the opponent, which according to recent military history has been a favorite practice and is naturally the concluding act of the operations on the battle-field, it does not follow that breaking the enemy's line

by a frontal attack is to be absolutely discarded. Circumstances of a varied kind may call for this mode of attack more frequently than is generally believed, especially in battles of many successive lines, in which each side, the defender as well as the assailant, will be apt to see his assaulting columns formed into wedges and result in a breaking of the opponent's line. In that event cavalry would find a sufficient field for employment in the centre at the decisive stage of the combat; a proper force of the arm would necessarily have to remain at the flanks. The commanding general must know intuitively what disposition to make of his cavalry within the sphere of the line of battle, so that at the opportune moment it may be found in its proper place and in readiness to act.

It is granted only to the independent cavalry divisions to be spectators during the execution of the infantry attack, not to the cavalry permanently assigned to the different tactical units—divisions and corps. The special duties of the divisional cavalry, that of security and information which it performed before the battle, it continues during the same. Placed at the flanks of its infantry divisions, generally separated into squadrons, its functions will be to keep up communication with adjoining bodies of troops and to maintain touch with the enemy. Even in the midst of the conflict will it be possible for their officers' patrols to render most valuable services by availing themselves of all favorable features of the ground. In the event of the opponents cavalry attempting to break into their own infantry the divisional cavalry must remember the effective results to be obtained in such moments by the charge of even the smallest closed bodies; and these will serve to indicate the proportionately greater deeds which large masses of this arm are capable of.

If in the further description of the battle of the future we follow the course of events in the contested struggle we finally arrive at its third stage, in which the assailant, after due preparation, is about to proceed to the assault which he of the defense is making every exertion to oppose. The latter is nearly reduced to the condition wished for by the assailant as a consequence of superior infantry and artillery fire. The defense does not yet find it prudent to make use of his reserves at so early a moment, since the opponent is still too distant and powerful. Yet something needs to be done that he may not have to succumb prematurely and that the premeditated assault of the assailant may not be undertaken with every prospect of success.

To get beyond this critical turning point of the battle safely, the assistance of that arm is needed, which without hazarding the final issue possesses the peculiarity of being able to hasten with great speed to aid in emergencies. When the necessity exists this arm will have to be launched into the fight unhesitatingly to bring about a favorable change. A charge of sufficiently large bodies of cavalry, having the elements of dash and surprise, will, because of the consternation and amazement which an effective and powerful appearance of this arm always produces upon the enemy, result in an amount of resistance sufficient to create a pause in the contest so sadly needed to turn the balance. While the author of the "Military Essays" would declare any one ordering such a charge a subject for the lunatic asylum, nevertheless the cavalry of the defense will be called upon

to render just such temporary relief, unless the arm or its leaders wish to subject themselves to the reproach that they remained idle spectators of the destruction of the sister arms and the disaster to follow. For if the different formations of the first line of the assailant (firing line, support and reserve) are suddenly met by an impetuous charge of cavalry forcing these lines to hesitate in their advance, to falter in their effort now about ready to become an assault, very much will have been gained towards a tactical issue and the sacrifices of the cavalry on the occasion will be worth the results obtained even if these are of but temporary benefit.

There are however but two fundamental conditions which would warrant such an employment of cavalry on these grounds of absolute necessity, viz.: 1st. That such action be made to possess the character of a powerful and uniform charge of a compact mass of cavalry and do not degenerate into scattering attacks of separate bodies (squadrons, even regiments) following one another at irregular intervals of time. 2d. That the leader of the cavalry understands properly how to judge and determine the moment for its interference and the direction to be taken. It is also necessary that the attack does not become a senseless rush; cavalry must remain under control and be capable of staying its charge at the proper moment to avoid losses beyond those the occasion requires. It would be a great mistake on the part of the officer commanding the assailants cavalry to engage that of the defensive forthwith. Discretion demands that the counter attack should not be made until after the enemy has broken through the firing line when he would have to be driven back to prevent his onslaught disarranging the lines in rear. Up to that moment the fire of the infantry will do more execution among the cavalry than could be expected from the sabres of the other arm and it would therefore be a matter for regret were the cavalry to engage prematurely and waste the fire of but a single rifle.

Though the direct pursuit by the assailant's cavalry is not to be checked until after a certain lapse of time, still its leader must have care not to proceed to the extent of reaching the immediate sphere of the enemy's infantry where it would be most difficult to rally.

The foregoing description of the conflict shows how intimately the three different arms need to coöperate in battle and how essential it is that the superior commanders of each should be fully competent to judge how to give initial support for the accomplishment of a single purpose.

The fourth and decisive stage of the battle—the culminating point of the bloody drama—occurs at the moment when the assailant proceeds to the actual assault.

Military Notes.

THE ARMY MEDICAL SCHOOL.

THE establishment of an Army Medical School in the City of Washington, D. C., was authorized by General Orders No. 51, A. G. O., June 24th last, for the purpose of instructing approved candidates for admission to the Medical Corps of the Army in their duties as medical officers. The medical curriculum of our colleges fails to qualify their graduates for many of the responsibilities that fall upon a medical officer of the army. The knowledge possessed by candidates generally of sanitary chemistry and bacteriology, of ventilation, heating, drainage, sewage, plumbing and kindred subjects is by no means of that practical character that would warrant them in dealing as experts with questions that are of frequent occurrence in the army, where every point having a bearing on the physical well-being of the soldier is now submitted to the medical officer for his opinion and recommendation. Surgeon-General Sternberg has therefore very wisely organized a school for the instruction of young officers in these subjects and in those relating to their duties as medical officers of the army for which their previous medical education had given them no training.

The school was opened November 1st, the following medical officers having been assigned as members of the faculty:

Col. C. H. Alden, Assistant Surgeon-General, President of the Faculty and lecturer on the duties of medical officers.

Lieut.-Col. Wm. H. Forwood, Deputy Surgeon-General, Professor of Military Surgery.

Major J. S. Billings, Surgeon, Professor of Military Hygiene.

Major Charles Smart, Surgeon, Director of the Sanitary Laboratory and Professor of Military Medicine.

Captain Walter Reed, Assistant Surgeon, Director of the Biological Laboratory and Secretary of the Faculty.

Captain Julian M. Cabell, Assistant Surgeon, instructor in Hospital corps drill.

ORDER OF DUTIES.

Daily except Saturdays, Sundays, and holidays:

9 A. M. to 12 M., Instruction in Pathological Laboratory.

1 P. M. to 2.50 P. M., Instruction in Chemical Laboratory.

3 P. M. to 4 P. M., Lecture.

Saturdays:

9.30 A. M. to 10.30 A. M., at Hospital Corps School of Instruction,

Washington Barracks—Practical instruction in Litter and Ambulance Drill and First Aid.

1.30 P. M. to 3. P. M., in Riding Hall, Fort Myer, Va.—Practical Instruction in Equitation.

The lectures will be delivered as follows:

Duties of Medical Officers, Wednesdays, except November 22, 1893, and January 24, 1894.

Military Surgery, etc., Thursdays throughout the course.

Military Hygiene, Fridays, except February 23, 1894.

Military Medicine, Tuesdays, November 7 and 14, Wednesdays, November 22, 1893, and January 24, and Mondays, January 29, February 5, 12, and 19, 1894.

The lecture hour from 3 to 4 on certain Mondays and Tuesdays has been reserved for auxiliary courses which will be of interest to the young officers of the Medical Department. On Mondays to and including January 24, 1894, the Surgeon-General will lecture on bacteriology, preparing the students for their practical work in the laboratory. Major George B. Davis, Judge Advocate, U. S. A., has kindly consented to lecture on Military Law on the Tuesdays in January. Captain J. C. Merrill, Assistant Surgeon, U. S. A., will occupy the Tuesdays in December with an outline of comparative anatomy, giving special attention to practical points connected with the anatomy of the horse and the venomous reptiles and insects that are frequently to be met in some parts of the country. Dr. Robert Fletcher, F. R. C. S., England, will lecture on medical jurisprudence on the Tuesdays in February (except the 27th) and on Friday, February 23d; and Professor C. W. Stiles, of the Department of Agriculture, has promised two discourses on parasites in man on February 21st and 28th.

In his address at the opening of the school the Surgeon-General spoke at length of his object in establishing it, congratulating the young men on the facilities now provided for enabling them to begin their professional work with a thorough practical knowledge of modern methods of research. Medical officers who had never had the advantage of pursuing such a course of study as was offered by the school could best appreciate its importance and value. He considered them fortunate also in having for their teachers men who had gathered their early experiences during the progress of a great war, and who were able to speak of camps and camp diseases, of battles, war surgery, the care of the wounded and the administration of great hospitals from a personal acquaintanceship with these subjects. General Sternberg also thanked these officers for the earnest support they had given him in carrying out his views, particularly as the work in connection with the school was additional to the regular duties of their position.

Colonel Alden, President of the Faculty, followed the remarks of the Surgeon-General with his first lecture on the duties of medical officers. He spoke of military discipline, showing that it did not belong exclusively to the army, but was necessary, and always to be found to a greater or less degree where bodies of men had to be controlled or where large and important interests were at stake, as in the management of railroads, manufacturing establishments, etc. Discipline implied merely a prompt, loyal and un-

questioning obedience to the orders of a superior. When one recognizes the importance and necessity of military discipline, obedience becomes a mark not of servitude but of loyal devotion to duty. He then referred to the two important duties of an army medical officer: A sanitarian first and a practitioner next. His primary duty is to prevent disease and preserve the efficiency of the command. He cited some published utterances of the Surgeon-General in this connection:—"The army medical officer is the health officer of his command, but the young graduate seldom is equipped with the knowledge or experience necessary to efficient action in this position. A course at the Army Medical school would prepare him to cope with the questions of practical sanitation that would be presented to him at every turn in his military career,—questions of site, soils and buildings, of ventilation, heating and occupancy, of drainage, sewerage and disposal of garbage, of the wholesomeness of water supplies, and of the various articles of food, the contractor's herd, slaughter house, the subsistence store rooms in the kitchen and mess hall, of the practical value of disinfectants, the bacteria which they destroy and the ptomaines which these elaborate; all bearing upon the preservation of the health of the military comity under his sanitary care."

Colonel Alden then discussed the subjects of command, the proper position of the medical officer, his rank and title, and then referred to his duties as divisible into three branches: First, he is to see that none but able-bodied and effective men fit to perform the duties and endure the hardships incident to military life are admitted to the service. He must therefore critically examine the voluntary recruit or drafted man or the person about to receive a commission. Second, he must carefully watch over the health of the command to which he is attached in order that no causes that may mar its efficiency can gain headway. He knows that the mere aggregating of men leads to disease, and that the experience of all campaigns shows that disease kills more than the enemy. He must be ever ready to draw attension to unsanitary conditions, or, in other words, must be the sanitary or health officer of the command. Third, he must keep himself always ready to relieve the sick and wounded in garrison, in the field, or in battle; to endeavor to make them effective again at the earliest practicable moment, or extend such measures of relief as may be possible if restoration to duty is impracticable.

A FIELD CANTEEN FOR OFFICERS.

The *Militar-Wochenblatt* No. 79 gives a description of a field canteen for officers which has been designed by Dr. Düms, a German medical officer, and is manufactured by A. Söhlimann, of Leipzig. The whole of the cooking vessels, plates, cups, etc., are made of aluminum, and the weight of the outfit for six persons is only about 9 lbs. The canteen is made in sizes to suit from four to ten persons. In addition to a complete set of cooking and eating apparatus, this canteen is provided with a strong wickerwork cover, which is not only convenient for fetching rations in the field, and for the conveyance of warm meals to officers on outpost duty, etc., but is fitted so that the whole canteen can be carried by a man, on a cart, or on horse-

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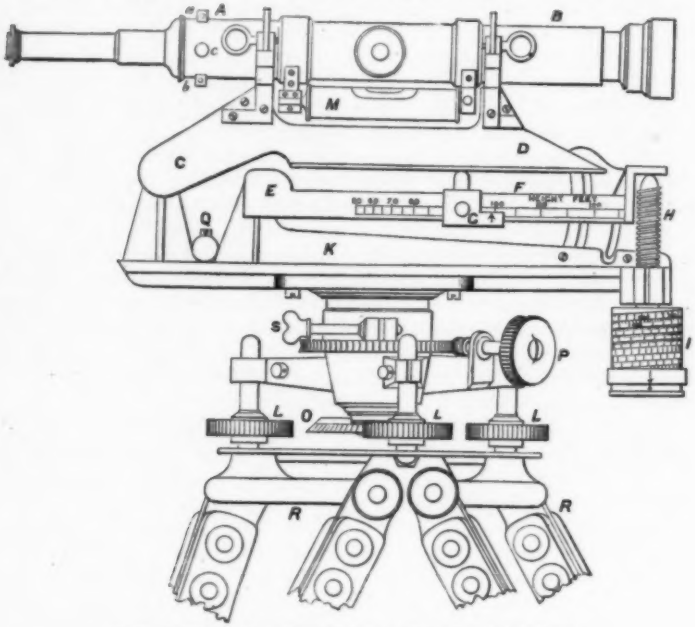
back. In this form, with certain additions for forming a field kitchen, the whole outfit for six persons weighs about 15½ lbs.—*Journal R. U. S. I.*



THE WATKIN DEPRESSION RANGE FINDER.

While examining the Watkin Depression Range Finder, displayed in the Ordnance Section of the War Department Exhibit at the World's Columbian Exposition, it occurred to me that a very essential mechanical contrivance for moving the slider which supports the telescope arm and by means of which corrections for change of altitude, etc., are made, had been omitted.

In the instrument referred to and illustrated in the accompanying sketch, the slider G moves with considerable friction on the arm EF, and as this movement is made by hand applied directly to the slider, the tendency is to destroy the level of the instrument in making the necessary corrections after the instrument is set up and levelled. If, now, an endless screw with medium pitch be attached and working in a female screw attached to the slider G be placed on the arm EF, the slider can be moved with greater ease and there will be little if any tendency to throw the instrument out of level.

I pointed this out to Mr. Hicks, the maker of the instrument, during his visit to the Exposition, but have not heard if the modification has yet been made.

H. L. HARRIS,
1st Lieut. 1st Artillery.

METAL SHIELDS FOR INFANTRY.

It would appear that the adoption of metal shields for the protection of infantry has been decided upon by the Danish authorities. Last year the sum of 75,000 crowns was voted for trials and for the purchase of Captain Holstein's infantry shields, and the Extraordinary Budget for 1893–94 includes a fresh credit of 25,000 crowns for the further purchase of shields. The *Spectateur Militaire* of the 1st September, has an article on the subject of the effect of artillery fire on these shields.—*Journal R. U. S. I.*

INFANTRY RECONNOITRERS.

As it is generally accepted that in a very close country cavalry will be unable to carry out a sufficiently complete reconnoissance; especially since the introduction of smokeless powder, this duty will in France, under such circumstances (according to the *Deutsche Heeres-Zeitung*), be entrusted to infantry detachments composed of men specially selected from regiments for this purpose. The regulations for field service now in force contain no instructions on this subject, but it is reported that experiments are being carried out during the current manœuvres with the object of fixing the organization of reconnoitring detachments in the infantry regiments. These reconnoitrers are to proceed to considerable distances in advance to gain detailed information regarding the enemy, without allowing themselves to be drawn into any fights, and, after attaining this object, to retire and act as battle patrols in front and on the flanks. Should the present experiments be successful, it is expected that the regulations for duties in the field, which are to come into force after the manœuvres, will contain definite instructions on this important subject.—*Journal R. U. S. I.*

APPARATUS FOR INDIRECT FIRE.

During the last manœuvres with masses of artillery at the camp of Chalons, France, experiments were made with an instrument for the regulation of the indirect fire of artillery, the invention of Captain Froissard. It is said that these trials gave the most satisfactory results. With the help of this apparatus a group of batteries, perfectly defiladed by an obstacle, such as high ground or artificial cover, was able to regulate its fire as easily as if it had not been masked, and had had a clear field of view.—*Journal R. U. S. I.*

INFANTRY FIRE AT LONG DISTANCES.

Experiments have lately been made at Grenoble with the object of determining the effect of infantry fire at long distances, and the results have proved that, contrary to the very general opinion, the fire of the Lebel rifle at 2000 m. (2187 yds.) is of considerable importance. At that distance 300 shots gave 50 hits (16.6 per cent). The size of the targets is not given in the article in the *Spectateur Militaire*, from which this note is taken. In war, of course, this percentage of hits would be very much diminished; but even supposing, as is usually assumed, that the hits in war would be only one-tenth of those obtained at the range, the writer of the article referred to arrives at the following conclusions:—A company of 200 would easily fire 10 shots a minute, and these 2000 shots would (at 16.6 per cent.) give 333 hits at the ranges, and, say, 33 on the field of battle. If the most rapid fire

possible were employed, the result would be nearly double. Under these circumstances, the writer maintains that artillery could not take up a position in open ground, and that cavalry without the aid of some infantry would be helpless under such fire. It is of interest to note that General du Guiny, in his instructions to the 3d Army Corps for the manœuvres of this year, directs that the infantry must not hesitate to open fire at 2000 m. if an opportunity presents itself. It would appear, therefore, that the long-distance fire of infantry is not altogether looked upon with disfavor in France.—*Journal R. U. S. I.*

MITRAILLEUSE IN THE CAVALRY DIVISIONS.

It is stated in the *Militar-Wochenblatt* that the introduction of a light mitrailleuse or quick-firing gun in the independent cavalry divisions is now under the consideration of the War Ministry. A similar gun is also to replace the 8-cm. gun in the mountain batteries. The gun which it is proposed to adopt is said to be so light that it can be carried, together with 2000 rounds, on a single horse, and it is understood that it will be able to fire 600 rounds per minute.—*Journal R. U. S. I.*

NEW PATTERNS FOR INFANTRY PACKS.

Trials are being made both in Prussia and Bavaria with several new patterns of infantry packs. The main peculiarities of these models are that the body of the knapsack is made lighter by the abolition of the wooden framework and the adoption of aluminum for all the metallic parts, such as buckles. The pack is divided into two main parts, so arranged that the lower portion, which contains the heavier and less necessary portions of the man's effects, can be quickly detached, leaving only the upper part (termed the "Sturmsack" or assault bag), which contains the reserve rations. This separation of the indispensable portions of the kit from the heavier and less frequently required part is made with the view of enabling the men to reduce their load to the minimum at the moment of making the assault, while even if they temporarily lose part of their kit, they will still have their three days' rations and aluminum water-bottle with them. The cartridge pouches in the Bavarian pattern have been rearranged, each of the two in front containing 45 rounds in place of 30, and the rear pouch holding 60 in place of 90, so that the total number of rounds remains 150 as before.—(*Revue du Cercle Militaire.*)

DISMOUNTED FIRE-ACTION OF CAVALRY.

It appears from a recent article in the *Invalide* that the greatest value is no longer placed on the instruction of the cavalry in dismounted action with fire-arms, but that greater attention is being paid to the use of the *arme blanche*. The article points out that the Russian cavalry has at various epochs been very proficient in the use of the sword, as during the twenties and thirties of the present century, and again after the Crimean War until 1870. Although the regulations only require that individual officers should be able to fight with the sword, many commanding officers consider it requisite to instruct all under-officers and men employed as scouts; but so far this has not been extended to the men in the ranks. Many proposals have

lately been made regarding the training of cavalry, and they all appear to include the demand that the dragoons, whose only weapon of defense is the sword, should be instructed in using it, and especially fighting against the lance.—*Journal R. U. S. I.*

CAVALRY EXPERIMENTS IN CARRYING CARBINES.

The method of carrying the carbine slung from the shoulder, which is at present in force in the French cavalry, has been found not to answer as well as was expected. Experiments are being made in 10 regiments during the current autumn manœuvres with three new patterns of slings, and a committee has been appointed to watch and report upon the trials.—(*La France Militaire.*)

NOTES ON LONG GUNS.

In *La Marine de France* is an interesting article on long guns generally, and the construction work of M. Canet more particularly. Without endorsing everything that is said in this article, we think that certain portions deserve great consideration. On the questions of the gun's power of resistance, the writer observes that exaggerated fears have been expressed as to the effect of gas wave pressure. In the first place, the shocks to which the gun is subjected are not greater in a long than a short piece, if the pressure is kept within admissible limits, namely, 2400 kg. or 15.2 tons per square inch. The same is true of the effect produced by erosion, which undoubtedly is the real cause of guns wearing out. Vibrations may be specially injurious to guns built up and composed of many elements, especially if not perfectly adjusted to each other by shrinking on. Displacements are no doubt often produced among hoops, which is one of the reasons why the new guns of great power made in France have but few elements and complete compactness, and their great length does not affect the question of resistance. Flexion or contortion of tube has given trouble in some navies, even with guns of medium length. The 110-ton guns of the *Benbow* and *Sanspareil* took a twist of double curvature for which it was necessary to allow in aiming the gun at any object. The Krupp 11-in. gun, of 35 calibres, for Russian coast service, had, after firing, a permanent bend, varying from 3 mm. to 13 mm. These permanent deviations from the axis, when they attain a certain amount, interfere with the accuracy of fire, and may cause accidents, because the path of the projectile not being a straight line, wedging and bursting may be produced, and in all cases the sighting suffers from increased friction. This question has attracted much attention.

It is not necessary, however, that the gun should be exposed to the action of vibration for flexion to be set up. Guns, especially those made on old-fashioned principles, may bend by their own weight. This may be tested by measurement, and found to alter on turning the gun round. In firing this is not found to affect the shooting. Hence this temporary flexion must be distinguished from permanent flexion. It is impossible to avoid this temporary flexion altogether, but it should be reduced to a minimum by the adoption of the best form or trace of piece. In the new guns for naval service Canet has a tube without hoops, which has great stiffness, and of which the moment of inertia with respect to the mounting is considerable.

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The vibrations have no permanent effect on the chase or tube proper outside the question of dislocation of elements. The molecules retain their natural condition under continued or repeated efforts. Experience, however, teaches that it is generally in the first rounds fired, especially with heavy charges, that inconvenience is caused. A similar phenomenon is seen when a steel projectile, which has been badly tempered, breaks under the single blow of a hammer, or even spontaneously. Now although it is more difficult to temper long tubes evenly than short ones, this is not a sufficient reason to condemn the long ones.

A Canet gun of 57 mm., 80 calibres long, fired at Havre in May, 1892, and a piece of 19 cm. of 80 calibres long, on the same system, tested in September and December, 1892, also at Havre, did not exhibit any deviation in the tube. Projectiles of 2.7 kg. (5.95 lbs.) and 13 kg. (28.66 lbs.) attained velocities of 1013 metres (3323 ft.) and 1026 metres (3366 ft). It has been objected that most of these guns have only fired a limited number of rounds, and that long-continued fire might produce injury; but there is nothing to justify this conclusion in experience up to the present time, but interesting trials, including testing to destruction, will probably soon be made at Gâvre. A gun may be made to bear continued strains as well as a bridge, and should a flaw cause it to yield rapidly, the evil is of a nature which may beset short guns as well as long ones. There is generally too much attention bestowed on resisting transverse strain, and nearly all guns have been constructed on theoretical principles which do not take account of the suddenness of the shock, nor of transverse or of flexional strains.

The new pieces have been constructed on absolutely different principles. A carefully designed form, after practical tests, offers all guarantees for a gun fired under reasonable conditions. The tendency is to increase the length greatly. The Director of Artillery, Colonel Roque, has taken a great step in this important question. He has ordered Canet guns of 55 calibres; and, at last, at Ruelle, a 15 cm. (5.9-in.) gun of 90 calibres length has been tried with success. There is every reason to think that the guns of the future will be of great length.

With regard to service on board ship, great length has been thought to constitute a great difficulty. This has weight, no doubt, with regard to some vessels; but it is often possible to replace a 14 cm. gun by one of 10 cm. calibre of such a length as to be equally powerful, and to have a flatter trajectory. Much may be done also by alteration in the mountings and balance of the pieces. The question of length deserves special consideration, offering, as it does, a great increase in velocity and energy, which may be taken advantage of to obtain greater range, a greater zone of destruction, owing to the trajectory being flatter, and greater accuracy of fire.—*Engineering, London.*

Reviews and Exchanges.

General William Nelson Pendleton.*

THIS has been to the authoress a labor of love in many senses. First to her hero and father, next to her husband, and above all to reproduce all the bitterness of the local and personal hate of that day, and to hold up those from whom special grievances were received to the scorn of the "civilized world." She has in the worst sense abided by her motto from Pascal, "Jai toujours pris un soin très particulier non seulement de ne pas falsifier, ce qui serait horrible, mais de ne pas altérer ou détourner le moins du monde le sens d'un passage."

The book is full of the worst of the Southern phrases of the war days and they are evidently now set forth with gusto. All of us old enough remember the richness of that vocabulary: We have, The enemy's hosts; the invading hosts; the yankee invaders; the yankee taskmasters; Sheridan, the ruthless invader; the yankee spite and southern spirit; the worthies of the South are a "galaxy," while inferentially, the mud-sills of the North are a coalsack; a respite from yankee outrage; Pope was *en route* to Gordonsville "with his headquarters in the saddle" [we remember hearing this frase from old General Jesup (a virginian) in the Seminole war and the irreverent used to add, 'Twere better that he kept his hindquarters there. The madam shouldn't be so hard on the South; surely Pope, a kentuckian, had a right to borrow the thunder of a virginian predecessor] and with his brutal orders and braggart boasts; yankee banditti; God frustrating the wicked purposes of Lincoln and the yankees; and, yankee malice and lust of power and plunder not still satisfied. [*Bishop Johns.*] The atrocious villainy with which the yankees war upon defenseless households; in Prince George they have let loose their negro soldiers to indulge at pleasure their brutal passions and the result beggars description.

Some of her personal charges will no doubt call forth rejoinders, if it be not too late in the day to refute. A great many people have died since 1865, beside the authoress' father.

The book is remarkable for bringing out the strong christian character of General Pendleton and his southern coadjutors. They certainly were more devotional—being more homogeneous gave them the opportunity—than our armies. They had the peculiar faculty in an eminent degree to adjust with the greatest compatibility the most devout christianity with the most vilifying wrong-headedness (viewed from a northern standpoint). On one point we take square issue with the author. As a matter of general or characteristic feeling there was no "*hate*" in the northern armies against the southern people.

Of course the readers must expect to hear that we were great cowards, were always beaten, and that the galaxy of chivalry had only to appear in order to put to flight the armies of the aliens.

An incident shows the temper of our cousins at that time, March, '63. "Friday we

**Memoirs of General William Nelson Pendleton.* By his daughter Susan P. Lee. J. B. Lippincott Co. Philadelphia. 1893.

had a visit from a young englishman, who has been through the indian sepoy war with Havelock, and who has come over to take another lesson in the art of war in the West. From the old world to the new; from the horrors of heathen warfare to the barbarities of yankee heroes. These last he abhors quite enthusiastically enough to please the most fastidious southerner. He says the english quite admire General Jackson, as they class him along with Havelock." On how Pendleton could have any pleasure in the flattery of an english abolitionist, or on how the englishman could have any sympathy in binding the freedom of five million negroes, the author does not vouchsafe us a remark.

With all this the book is entertaining and instructive. It gives a remarkable picture of a noble life, of an energetic man, fighting from his young manhood against reverse after reverse and establishing a most admirable and loving household, when on the eve of an ideal autumnal age of a harvest reaped from the severest trials of sowing and cultivation, rude war stept in, swept away home comforts and brought death and sorrow in its train.

As General Pendleton was Chief of Artillery of the Confederacy and as the military part of the book, which concerns us the most, is principally filled with the work of that arm, we may take from it much that will do us good and is of applicability to our own day.

The first proposition gleaned is that from the work of their artillery at the first Bull Run both Pendleton and Johnston were impressed with the efficiency of the 12-pdr. howitzer, afterward changed for the Light Napoleon. They had their brass 6-pdrs., owned or captured, recast into napoleons.

Though placed in charge of the artillery of the Army of the Potomac almost on joining, yet Col. Pendleton was not made brigadier-general till March 26, 1862. It was the earliest moment that the confederate congress was forced out of federal tradition that artillery had no need of a professional director. Probably if they had had a General-in-Chief who would have feared the Chief of Artillery passing from his hands to the direct control of the Secretary of War in administrative matters, the Confederacy never would have had a Chief of Artillery. The act of January 22, 1862, allowed one brigadier to 80 guns, one colonel to 40, one lieutenant-colonel to 24, and one major to every 16 guns. They formed a corps.

General Pendleton divided his corps into three battalions, one colonel and two majors commanding at Bull Run, we believe.

The battles on the Chickahominy are given very fairly. The general's diction in his letters home sounds odd; so much of his language of a doctor of divinity standing in juxtaposition with his military exegesis.

General Pendleton accuses McClellan sneeringly of "creeping up" after the confederates in the Peninsular campaign, inch by inch with the spade and big guns. Some yankee critics impute our general's failure to this cause. We judge that General Pendleton thought it quite feasible for McClellan after he was beaten back from the northern side of the Chickahominy to concentrate on the right bank and enter Richmond, opening James River to his gunboats, and become master of the situation. This danger was so imminent that the few left behind by Lee to prevent it were heavily tasked in their arrangements to make the best resistance possible.

These battles of the 28th and 29th of June General Lee declared to Pendleton to have "exceeded in severity not only anything he ever saw, but anything he ever read of." It is difficult to learn whether the author desires to refer the Confederate victory to the superiority of Lee, or to the pusillanimity of McClellan, or to the native inferiority of the yankee *morale*. She accords Lee 75,000 men and McClellan 114,000, these latter fully supplied and equipped, the former lacking in arms, equip-

ment, and ammunition. "General McClellan at the close of the prolonged contest, found himself many miles farther from Richmond, the objective point of all his operations, his fortifications abandoned, his vast stores destroyed, his army forced to retreat day after day, disheartened and demoralized, and congratulates himself and the country that he has at last ensconced the great host which was to seize the rebel capital safe under the shelter of the gunboats and out of reach of the enemy." Rather fine irony!

The writer's description of the suffering in Richmond, and of its home and society life after these battles, is idyllic and well calculated to bring the tear to the eye of friend or foe.

To return to the professional matters involved we give for the benefit of the JOURNAL's reference columns part of G. O. 71, Genl. Lee's H. Q.: the scheme supplied by Genl. Pendleton.

"5. The chief of artillery in each division will have charge of all the batteries thereto attached, whether acting with brigades or held in reserve. A battery duly assigned to a brigade will, until properly relieved, report to and be controlled by the brigade commander. It must, however, report to and be inspected by the division chief of artillery as he may require. When a brigade battery needs relief it will, when practicable, be made to change places with one of those belonging to the division reserve. Should this be impracticable, application, authorized by the division commander, must be made to the army chief of artillery for temporary relief from the general reserve.

"6. The army chief of artillery will have general charge of that branch of service and special direction of the general reserve. He will, under instructions from the commanding general, see that the batteries are kept in as efficient condition as practicable, and so distributed as to promise the best results. To this end he will require from the several chiefs of artillery weekly returns exhibiting the condition of each battery and where it is serving. He will also make the commanding general a tri-monthly report."

"The faithful execution of these orders * * * brought that arm up to the efficiency which it maintained up to the surrender at Appomatox Court-House."

Drastic remedies were possible for the chief of artillery in the confederate service: "—— in other instances where officers and men had proven careless of responsibility, companies were broken up, and the men and guns distributed where they could be made of more service." In Genl. P.'s report on the McClellan invasion, he had remonstrated against the inadequate use of artillery in the Seven Days' battles. * * * He had urged that more batteries should be thrown into action and their fire concentrated. "This advice was acted on with evident success in the battles of Second Manassas, where the combined fire of the Confederate batteries had done admirable execution, and repeatedly silenced the opposing guns and mowed down the lines of advancing federals. From this time on the artillery became more and more appreciated as a powerful agency not only in opening an engagement, but in checking the advance of the enemy, silencing his batteries, and harassing his retreat."

On Lee's retreat from Sharpsburg, Pendleton claims to have covered that army's retreat with 40 pieces of artillery and 600 infantry "keeping at bay for hours the whole hostile force of artillery, cavalry, and infantry"; certainly, a compliment to his arm, and well-earned as their losses showed.

For the use of the JOURNAL's readers we give the artillery organization of that campaign, September '62. With the First Corps, *Longstreet's*, nineteen brigades adjusted into five divisions of infantry,—served forty-five rifles, sixteen napoleons, sixty-four common smooth-bores [6-pdrs. ?] arranged into six battalions of several bat-

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teries each; of which battalions one attended each division and one constituted the corps reserve artillery, 112 guns in all. With the Second Corps, *Jackson's*, of four divisions served an artillery force of fifty-two rifles, eighteen napoleons, and fifty-three short-range guns, 123 guns in all, and similarly assigned as in first corps. With Stuart's cavalry corps were two rifles and two 12-pdr. howitzers. The general reserve artillery consisted of three battalions with fifteen rifles, one napoleon, and twenty short-range guns [6-pdrs. ?].

It would seem from this record that the duties of a chief of artillery are multifarious and Genl. Pendleton especially couldn't have been an idler. The artillery had to hunt up deserters and stragglers, and generally, take care of all unorganized or disorganized bodies. He had to search out all factories of any use to an army; he built bridges, and mended roads in his leisure moments. Wasn't there some remains, in Genl. Lee's and his advisers' minds, of the old army tradition that *there* was a horse and a man, and let them be used for scouting and hauling when not dragging a cannon into action. As to the injury to the arm, what matter?

The successful defense of Chancellorsville is claimed for the artillery; the author quotes Genl. Lee: "To the skillful and efficient management of the artillery the successful issue of the contest is in great measure due. The ground was not favorable for its employment, but every suitable position was taken with alacrity, and the operations of the infantry supported and assisted with a spirit and courage not second to their own. It bore a prominent part in the final assault which ended in driving the enemy from the field at Chancellorsville, silencing his batteries, and by a destructive enfilade fire upon his works opened the way for the advance of our troops." "The Union reports also speak of the 'accurate,' 'heavy,' 'tremendous,' 'galling' fire of the guns at Chancellorsville; of their 'great accuracy' and 'terrible execution,' and from 'very heavy losses from the enemy's artillery'; and the same strong expressions are used of the artillery fire at Fredericksburg and Salem Church."

In June, '63, the organization of the artillery was with 270 pieces, three brigadiers, seven colonels, twelve lieut.-cols. and eighteen majors; but of this organization only one brigadier-general was commissioned, Pendleton, despite his constant urging the necessity for them as improvement to the service and as "a well-earned promotion for gallant deeds on a many a hard fought field." This was not gained till later and even then Pendleton was left with his scrimp brigadiership. Still, in his position of chief, he says: "Having assigned the reserve artillery battalions, I have now no special charge but superintend all the artillery, and direct in battle such portions as may most need my personal attention. This is a better arrangement, I think. My work will be much as it has been, but freer, as none of the petty details of one or two battalions will require my care."

In Bishop Johns' report to the *Virginia Council* [diocesan convention] of 1863, alluding to a visit to General Lee's army he says: "If in the life and influence of this christian general and other eminent officers, his worthy associates in our eventful struggle for civil and religious liberty, we do not gratefully recognize a most significant encouragement to hope for a successful issue, we should be justly liable to the charge of slowness to perceive the tokens of good which have been vouchsafed to us, and criminally delinquent in the gratitude which they should awaken." We quote this for three reasons. It shows that our finite minds cannot always judge of the Makers purpose and intent. It shows how a prelate may become so infatuate as to call his war "a struggle for *civil* and religious *liberty*," ignoring the existence of the one-third of his proximate human beings. It shows how wise the North was in keeping the politics of the struggle out of the Church.

In November '63 the general calls for another reorganization of the artillery due to

the various causes of disability among the field officers and the want of another brigadier; his extreme modesty in not hinting and of never having asked for nor recommended a major-generalcy for himself is quite notable. He concludes with "Even with the recommendations now submitted, the number of artillery field-officers will be only about three-fourths of those belonging to three brigades of cavalry or infantry having anything like the number of men, companies, etc., constituting this artillery."

On page 342, Mrs. Pendleton is a bit rough on the officers of the 20th Pennsylvania cavalry at Lexington. It will probably call out a rejoinder; such things generally do.

Pendleton as in his life work, was an enthusiast in artillery. In his report on the events of 1864 he says: "In the whole of the eventful campaign of 1864, the artillery of the army of northern Virginia bore a distinguished part, and in every portion of the widely-extended field of operations rendered signal service. It has everywhere and at all times proved reliable, how great soever the emergency. In the wildest fury of battle, under ceaseless harassment and exposure from sharp-shooters and shelling on the lines, on the toilsome march, amid all the hardships of the trenches, through summer, fall, and winter, and when steadily breasting the tide of reverse against friends unnerved and foes flushed with triumph, the brave officers and men of this branch of our army have almost without exception exemplified the very highest virtues of christian soldiers battling for their faith, their honor, and their homes."

In all, there were four brigadier-generals of artillery made, Pendleton, A. L. Long, E. P. Alexander, and R. L. Walker. Slowness of acknowledging the right to promotion in the arm there is an effort to account for by the general. "On the ground probably, that this arm of the service, all-essential as it is, can never be independent, but always only coöperative with others, confederate laws allowed on it no grade above that of brigadier. Only such, therefore, was I to the last, though having under me three other artillery brigadiers, and, consequently, serving as a major-general. But as no exaltation of name was, so far as I know myself, a ruling motive with me, the incongruity never disturbed me. It was about to be corrected on General Lee's recommendation when irremediable reverse befel our army and cause."

The description of the last days of the Confederacy is masterly and touching. It will exact the sympathy and admiration of every brave man for an exhausted and fallen foe.

If Mrs. Lee's comments on the strategy and rationale of the war, the description of the battles and deductions from them, are her own, she is a fenomenal woman.

The book is a real addition to an understanding of the inner workings of the war, its errors are easily corrigible; it is a fine description of a beautiful character, holding conscientiously the idea that slavery was heaven-directed or encouraged, and that man was property; its blemishes are the evidently sweetly-enjoyed desire to repour the recrudescent vials of hate on the vile yankee. It is not probable that its perusal by this generation will do more than make them stare at the infatuation of those times and places; to the men of that time it will bring up again a fading picture to fetch a sad smile; but to the youth of the South it will be an unmitigated injury, in that it will be drunk without the corrective. J. H.

Index to the Literature of Explosives. Part II.*

With the publication of "Part II. to the Literature of Explosives," Professor Charles

**Index to the Literature of Explosives. Part* II. The Determination of the Relative Sensitiveness of Explosive Substances through "Explosions by Influence." The Composition of Certain Modern Powders. By Professor Charles E. Monroe, Columbian University, Washington, D. C.

XUM

E. Munroe has brought to date his most valuable compendium of this widely scattered literature.

Up to the present time, with the exception of M. Berthelot's treatise "Sur La Force des Matières Explosives d'après La Thermochimie," there have been but few attempts to consider the subject of explosives logically, and to systematize the results. The majority of investigators have been content to publish their individual efforts from time to time in various scientific journals, or in the form of brochures or monographs with the result that it is almost impossible for one who has not kept thoroughly informed on the subject to know where to turn for information.

Prof. Munroe has thoroughly indexed the numerous papers and periodicals containing "not only such articles as treat of the composition and of the chemical and physical properties of explosive substances, but also of their manufacture and use in the arts."

It is to be hoped that with the severance of his connection with the service as chemist to the Torpedo Corps of the Navy, and the assumption of new responsibilities as Dean of the Faculty of the Columbian University, as well as Professor of Chemistry in the same institution, he may still find opportunity to continue the valuable work so ably begun.

Vol. XV., No. 1, of the Journal of the American Chemical Society contains the results of two investigations by Professor C. E. Munroe, B. S., one upon "The Composition of Certain Modern Powders." the other on "The Determination of the Relative Sensitiveness of Explosive Substances Through 'Explosions by Influence.'" The powders investigated by Prof. Munroe belong to the class known as "smoke-weak" or smokeless powders, and are absorbing the attention of all experimenters in this country and abroad.

The method of analysis pursued in his investigation is concisely but clearly outlined and his results give the composition of various sporting powders. and of the following mixtures which have been proposed for use as service propellants, viz.: S. K. Powder, S. R. Powder and Rifleite, made by the Smokeless Powder Company, Limited, at Barwick Works, Herts, England; Maxim Powder made in the United States; and the Experimental powder received by the Ordnance Dept. U. S. Army, for trial in the new 8" B. L. rifle.

Of those proposed for service powders, Maxim powder alone contained nitroglycerine, all of the others, both for sporting and military purposes containing as their active principle a mixture of soluble and insoluble nitro-lignin; or soluble and insoluble gun-cotton.

It is extremely doubtful if any powder containing soluble nitro-cellulose in any form (*i. e.*, lower nitrated products) will be found to stand the test of service storage through varying climatic and atmospheric changes.

On the other hand the unreasonable prejudice against the use of nitroglycerine in the new powders is rapidly disappearing, due largely to the education of the public mind to a realization of the fact that that explosive can be made equally as stable and transformed into equally as safe a condition as guncotton which has for the past score of years been accepted as a thoroughly safe compound. In this connection it is also to be noted that of the powders so far experimented with, those containing a percentage of nitroglycerine, have proved most promising both as regards their interior and exterior ballistic properties and their stability during storage.

In his second paper Professor Munroe publishes valuable data as to the relative sensitiveness to detonation of several of the better known high explosives.

Just exactly what is to be understood by "Explosion by Influence," or "Sympathetic Explosion" is still a matter of conjecture. The rationale of detonation is by no means

understood, and whether we accept Abel's Theory of Synchronous Vibrations, Berthelot's Physico-Chemical Theory, or the results of Threlfall's investigations, there remain a host of phenomena accompanying these secondary explosions which cannot be explained or accounted for by any one or a combination of all the theories advanced by these eminent scientists. The inherent danger of all such investigations precludes that close scrutiny and observation so necessary in compiling data upon which to base chemical or physical theories, and at best the results of experimenters in this direction are more or less unsatisfactory.

By reason of his experience in this line of investigation the results published by Prof. Munroe are extremely valuable, and his practical suggestions open up an important line of experimentation.

To the Danish experiments under water (referred to) are to be added those conducted in the same medium by General Henry L. Abbot, U. S. Corps of Engineers, which comprise probably the most exhaustive observations yet recorded.

The modifications in these results due to the change of medium through which the action of the explosive (or explosive wave) was propagated were of course to be expected, while the manner in which the explosives are supported, whether on earth, wood, masonry or metals of varying thickness and rigidity, will undoubtedly be found to exercise a very material difference in the several results.

W. W.

The Cavalry Fight at Brandy Station.*

The portraits are of Stuart, Hampton and Fitzhugh Lee, and of Farley and the two authors, von Borcke and Scheibert, who were three staff officers. The maps are one of the general field of operations preceding this noteworthy cavalry fight, and four of its different phases, at 6 A. M., when it opened; at 10 A. M., at 12 M. and at 2 P. M. The full page pictures represent Lee dictating a dispatch, the alarm at Stuart's headquarters, the enemy in retreat, Major Heros von Borcke leading the Confederate cavalry in the attack, an incident during the battle, Lee and Stuart watching the enemy withdrawing, Stuart planning an attack—all more or less imaginary.

The book purports to be based on the actual personal experience of the authors, supplemented by the "Official War Record," of which we are told that, by the courtesy of the United States Senate, a copy was specially sent to Colonel v. Borcke. That doughty hero has already given the world a proof of his inability to tell the whole truth, in his earlier book on the Rebellion, and Captain Scheibert, although sent to this country to observe the war as the representative of a neutral country, took a position on the staff of Stuart and Lee, and has since devoted a good deal of literary ability to making their achievements known abroad. Their book opens with the broad statement that since the wars of Napoleon no cavalry battle equals that at Brandy Station in importance, and the authors, who took part in it, describe it in detail as a very valuable lesson for cavalrymen nowadays. As they assert that it was throughout a victory for the Confederates, the value of their military judgment is easily gauged, for it is generally agreed that its substantial results were all on the side of the Union forces, for by it the march of the Army of the Potomac was made undisturbed, while Stuart's cavalry was so much crippled that the real use of it for Lee was largely lessened, and when Stuart met Gregg at Hanover Court House, the latter drove him off, and thus kept Lee without the help of his cavalry, the eyes of an army, and hence much of Lee's disadvantage and Meade's success in the crowning victory of the war. It is admitted that Stuart's

**The Cavalry Fight at Brandy Station*, June 9, 1863, by Col. H. von Borcke, Chief of Staff of General Stuart, and Captain Scheibert, with 6 portraits, 5 maps and 7 pictures, drawn from a war sketch book by C. Sellmer. Berlin.

forces were in no position to resist the attack at Brandy Station, for, although larger than those of the Union cavalry, they were scattered, so that an important part of the Confederate cavalry took no part in the action, while the Union cavalry was kept well together, and when it had done its work was able to withdraw under the cover of a supporting force of infantry. In point of fact, the battle of Brandy Station was the first of a series of victories for the Union cavalry, which increased in numbers and importance, and largely contributed to the final result. Colonel v. Borcke gives sketches of Lee and Stuart, of Hampton, and the two cavalry Lee's, Fitzhugh and "Runy" (W. H.) Lee, of Farley, and, at greater length, of himself and his fellow author, Scheibert, as well as of Pleasonton and Wyndham, of the Union army. Throughout all his sympathies are with his old companions in the Confederate army, in whom he finds all the virtues. He compares and contrasts the cavalry of the Confederate and of the Union armies, largely to the disadvantage of the latter, and says that the great leaders of reform in the cavalry arm of Germany drew their inspiration from Stuart and his ability to plan the strategic operations which cavalry could best execute. He blames General Lee for opening the battle of Gettysburg while Stuart was away, but no doubt the business of Stuart was to keep close to the main army, just as Buford and Gregg did, thus serving as the eyes and ears of Meade's army, and greatly assisting and contributing to its victory. Having thus cleared the ground, Colonel v. Borcke gives a detailed account of the battle of Brandy Station from its opening at daybreak until its close with the end of the day. He puts the forces engaged at 28,000 on both sides; admits that the action was a surprise on the part of the Union cavalry; acknowledges the brilliant leadership of Buford and Gregg, and the admirable plan of their attack, but says it was not energetically executed, although there was still greater inefficiency on the part of Fitz Lee's division, which, owing to his absence from sickness, was entrusted to a less able leader. He asserts that the Union forces were stronger in cavalry and in five regiments of infantry, and says that Stuart succeeded in keeping the Union force from reaching Lee's main army; but in point of fact the Union force did all it was intended to do, and did it well. Colonel v. Borcke supplements his detailed narrative of the successive events of the battle by extracts from the official reports of Colonel White and Major Beckham, and by his own and Captain Scheibert's personal observations and diaries, and by a very short abstract of Pleasonton's despatches. He gives a general sketch of the battle, in which he admits that Gregg came very near driving Stuart's cavalry, while Buford gave it quite enough to do to hold its own, and tries to throw the blame on the want of ability in Stuart's subordinates, always a reflection on the commander, who ought to know what his lieutenants can do to carry out his plans. Stuart's Instructions for Cavalry, dated July 30, 1863, are printed in full, and give a good idea of his views. The personal glorification of von Borcke and Scheibert diminishes the value and interest of their account of the battle of Brandy Station, yet the book has a certain attraction for all who took part in that brilliant action, and its story can never be told too often.

Resistance of Ships and Screw Propulsion.*

In his professional work, the author had often felt the need of a short treatise upon the resistance and propulsion of ships, containing data, formulæ, and tables for use in making estimates and has endeavored—and with success—to produce such a work.

In handling the subject the papers read at various times before the Institution of Naval Architects by the late Mr. William Froude, and by Mr. R. E. Froude, his son,

* *Resistance of Ships and Screw Propulsion.* By D. W. Taylor, Naval Constructor, U. S. Navy. Macmillan & Co., New York and London. 1893.

have been made much of. This was necessarily the case, since the theories set forth in these papers are now generally accepted, and the experimental results given in them stand alone for accuracy and completeness.

The book contains besides much original matter which must prove of value to naval engineers and architects.

The writer throughout the work has discussed ships as they are, not floating bodies in general, and the methods set forth and results deduced are presented as simply as the nature of the subject would allow and with an accuracy suited to everyday use.

The various chapters deal with the subjects of resistance, the propeller, mutual reaction between propeller and ship, analysis of trials and average results, the power of ships, and propeller design.

The book is presented in the excellent shape for which the Messrs. Macmillan are so favorably known.

Outposts, Patrols, Advanced Guards, Rear Guards.*

This little book combines the elements of all that is necessary to know on the subjects treated.

The pamphlet is the result of a study of standard works such as those of Generals Pierron and Rüstow and Colonels Derricagaix, Maillard, Clery, etc., and must prove very useful to any one who has neither time nor opportunity for extensive research in military books.

The subject is clearly and logically treated and the book is printed in clear type and convenient form.

**Outposts, Patrols, Advanced Guards, Rear Guards.* By Captain James S. Pettit, 1st U. S. Infantry. Published by Captain J. S. Pettit, New Haven, Conn.

Announcement.

AT a meeting of the Executive Council of the Military Service Institution, held on the 24th day of November, 1893, the several reports of the members of the Board of Award on the Prize Essay for 1893 were read and it was found that the essay signed "Americanus" was unanimously decided to be entitled to the prize; the essay signed "Palma non sine pulvere" to first honorable mention; and the essay signed "Pan America" to honorable mention.

Upon opening the accompanying envelopes the Prize Essayist was found to be Captain GEORGE P. SCRIVEN, Signal Corps, U. S. A., who thereupon became entitled to the prize medal of the Institution.

The essay entitled to first honorable mention was written by Lieutenant WM. R. HAMILTON, 5th U. S. Artillery, and the one entitled to honorable mention by Lieutenant LEWIS D. GREENE, 7th U. S. Infantry.

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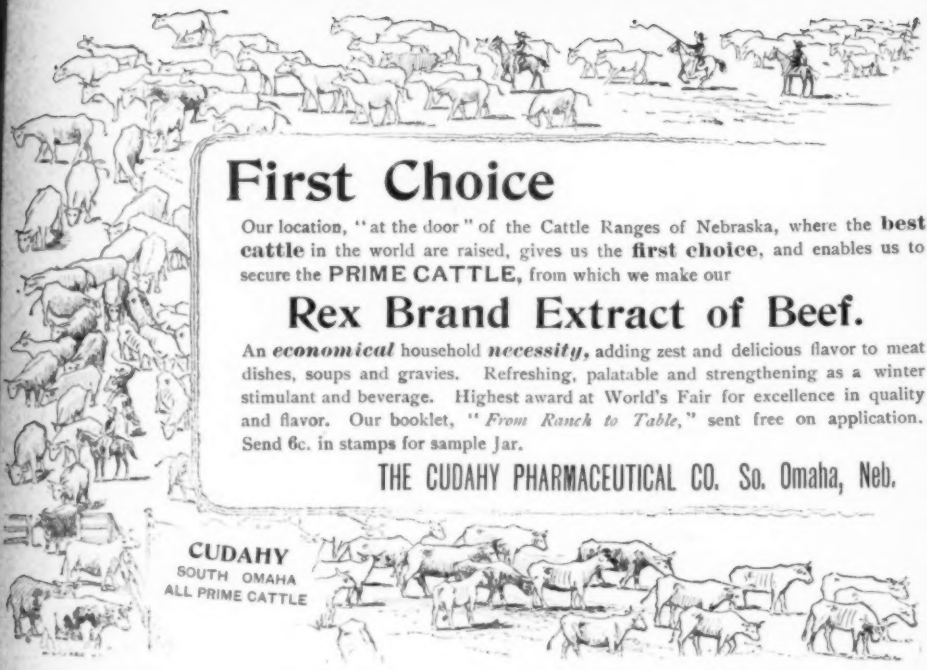

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NOTE.—Checks and Money Orders should be drawn to order of, and addressed to, "The Treasurer Military Service Institution," Governor's Island, New York Harbor.

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Prize Essay—1894.

I.—The following Resolution of Council is published for the information of all concerned:

Resolved, That a Prize of a Gold Medal of suitable value, together with a Certificate of Life Membership, be offered annually by THE MILITARY SERVICE INSTITUTION OF THE UNITED STATES for the best essay on a military topic of current interest; the subject to be selected by the Executive Council and the Prize awarded under the following conditions:

1. Competition to be open to all persons eligible to membership.*

2. Each competitor shall send three copies of his Essay in a sealed envelope to the Secretary *on or before September* 1, 1894. The Essay must be strictly anonymous, but the author shall adopt some *nom de plume* and sign the same to the Essay, followed by a figure corresponding with the number of pages of MS.; a sealed envelope bearing the *nom de plume* on the outside, and enclosing full name and address, should accompany the Essay. This envelope to be opened in the presence of the Council after the decision of the Board of Award has been received.

3. The prize shall be awarded upon the recommendation of a Board consisting of three suitable persons chosen by the Executive Council, who will be requested to designate *the Essay deemed worthy of the prize;* and also in their order of merit those deserving of honorable mention.

4. The successful Essay shall be published in the Journal of the Institution, and the Essays deemed worthy of honorable mention shall be read before the Institution, or published, at the discretion of the Council.

5. Essays must not exceed twenty thousand words, or fifty pages of the size and style of the JOURNAL (exclusive of tables).

II.—The Subject selected by the Council at a meeting held Nov. 24, 1893, for the Prize Essay of 1894, is

"*DISCIPLINE:—Its Importance to an Armed Force and the best means of Promoting and Maintaining it in the United States Army*"

III.—The gentlemen chosen by the Council to constitute the Board of Awards for the year 1894 are:

General JOHN GIBBON,
General WAGER SWAYNE,
Colonel F. V. GREENE.

WM. L. HASKIN,
Secretary.

GOVERNOR'S ISLAND,
January 1, 1894.

* "All officers of the Army and Professors at the Military Academy shall be entitled to membership, *without ballot*, upon payment of the entrance fee. Ex-officers of the Regular Army of good standing and honorable record shall be eligible to full membership of the Institution *by ballot* of the Executive Council.

"Officers of the United States Navy or Marine Corps shall be entitled to membership of the Institution *without ballot*, upon payment of the entrance fee, but shall not be entitled to vote, nor be eligible to office.

"All persons not mentioned in the preceding sections, of honorable record and good standing, shall be eligible to Associate Membership *by a confirmative vote* of two-thirds of the members of the Executive Council present at any meeting. Associate Members shall be entitled to all the benefits of the Institution, including a share in its public discussions, but no Associate Member shall be entitled to vote or be eligible to office."

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FOURTH REGIMENT OF INFANTRY.

By Lieut. JAMES A. LEYDEN, Adjutant 4th U. S. Infantry.

THE Legion of the United States, by which title the regular army was known from 1792 to 1796, was a theoretically well balanced military organization of four divisions, each division or sub-legion containing Dragoons, Rifles, Artillery and Infantry. Whatever merit this organization might have had against a civilized enemy in an open or civilized country, it was found to be poorly adapted to the various requirements of Indian warfare or ordinary frontier duties in a wooded country. That the important battle at Miami Rapids was fought and won under this organization was due, not to any particular merit in the organization, but to the admirable discipline instilled into the command by the Commander-in-Chief, General Anthony Wayne. "Train and discipline them for the service they are meant for," wrote Washington. These instructions were so faithfully complied with that it was common remark that the "mad commander" had become a most thorough and painstaking disciplinarian.

The cessation of active Indian warfare, and the occupation of many remote stations, called for a simpler administrative organization, and, pursuant to Act of Congress May 30, 1796, the Legion was disbanded in November 1796, the President arranging and completing out of the infantry of the sub-legions, four regiments of infantry. The Fourth Infantry was in consequence organized from the infantry of the 4th sub-legion, with Thomas Butler, of distinguished lineage and revolutionary service, as lieutenant-colonel, commandant.

The evacuation, in 1796, of the British military posts in the Northwest, under Jay's treaty, and the occupation of the territory ceded by Spain to the United States, by the treaty of October 27, 1795, necessitated the dispersion of the newly organized regiments to many widely separated stations, the Fourth Infantry going, in June, 1797, to Tennessee and Georgia. In the interval between 1796 and 1802 there were many changes in the regimental organizations, the personnel varying from 30 commissioned officers and 502 enlisted men, in 1796, to 49 officers and 1036 enlisted men in 1799.

Spain having become allied with France, and as strained relations existed between France and the United States, it was for a time doubtful whether peaceable occupation of the lately ceded territory of Louisiana would occur. Emissaries and spies had been sent out from Louisiana to ascertain the temper of the people of the Mississippi Valley upon the subject of separation from the Union and the formation of an independent government under foreign protection. The reports of these agents is interesting

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reading. One of them, reporting upon the army, says; "There is a strict discipline observed in the army. The soldiers are almost all youths from 16 to 26 years of age. They go through some military evolutions with sufficient precision. With respect to the officers from the lowest to the highest (excepting very few) they are deficient of those qualities that adorn a good soldier, excepting fierceness, and are overwhelmed in ignorance and in the most base vices." In view of the fact that this very spy had been taken in hand by the military and escorted by an officer outside of the United States territory, his judgment may have been somewhat warped.

Occupation of the newly acquired territory was not resisted, and Congress concluded in 1802 to reduce the military establishment. The new law provided for but two regiments of infantry and the Fourth Infantry was, June 1st of that year, disbanded. Some of the officers were retained in other organizations, some resigned and the remainder were honorably discharged.

International affairs in 1808 were in such a condition that the President asked Congress to increase the military strength of the regular army; and by the unparalleled vote, on military matters, of 98 to 16, the House passed a bill providing for an increase of seven regiments of infantry. The Fourth Infantry under this Act was reorganized in the months of May and June, 1808. It was recruited in the Eastern States, and John P. Boyd, of East India fame, was named its first colonel. In the spring of 1809 the organization was completed and the companies were stationed at Boston and various other points in the New England States. No important changes of station occurred until the spring of 1811, when the regiment was ordered to concentrate at Philadelphia, Pa. The companies having arrived at the Lazaretto, a short distance from the city of Philadelphia, orders were then received to proceed to Pittsburgh. In compliance with these orders the regiment started, June 3d, on the march across the State of Pennsylvania, arriving in Pittsburgh on the 28th of the same month. Four weeks had been pleasantly passed in the city when orders directed the regiment to proceed by river to Cincinnati. Arriving at Cincinnati camp was established on the present site of Newport Barracks until August 31st. War Department orders then directed that the regiment proceed to Vincennes, in the Indian Territory. The journey down the Ohio was resumed. The regiment having made the portage at the falls, continued down the river to the mouth of the Wabash, and thence up that stream to Vincennes, experiencing many hardships and difficulties owing to the size of the boats and the difficult current of the stream. At Vincennes the regiment was joined by a force of militia and volunteers, and August 27th the entire command left the trading post and marched up the river to a point near the present town of Terre Haute, where a post called Fort Harrison was built. The Prophet,—brother of Tecumseh and leader of the Indians then causing trouble,—refused all overtures, and November 6th found the command within three miles of his village.

On the following morning, before dawn, the Indians made a furious attack upon all sides of the camp, and the desperate contest continued until daylight enabled the troops to discover their enemies; vigorous bayonet charges

then drove the Indians from the field. The coolness and discipline of the regiment undoubtedly saved the command from annihilation. Out of 300 present the regiment lost 77 in killed and wounded, including four officers, one of whom was mortally wounded by tomahawk.

Owing to want of supplies and proper accommodation for the large number of wounded, the little army returned to Fort Harrison, (where Captain Snelling's company was left as a garrison) and thence to Vincennes for the winter.

In the spring of 1812 the Indians to the north were causing much trouble and there were strong probabilities of a war with Great Britain, whose agents were identified with the Indian difficulties. General Hull, on account of his knowledge of the Indians and his former good record, had been given command of all the forces in the Northwest, and the regiment was accordingly ordered to join other troops under his immediate command.

In obedience to these orders the regiment walked from Vincennes to Cincinnati and thence to Urbana, arriving at the latter place July 3d, the day before the receipt of the declaration of war against England. General Hull's command arrived at Detroit on July 6th, after a most arduous and trying march through the forests of Ohio. On the 12th it crossed the river for "an invasion and conquest of Upper Canada." Camp was established at Sandwich, on the Canadian side of the river, and the troops remained there for nearly a month without making hostile demonstration, although the Canadians and Indians were known to be concentrating at Malden, but thirteen miles down the river. A mutinous spirit began to manifest itself on account of this inactivity.

Governor Meigs had forwarded a considerable supply of provisions and clothing for the use of the army, and a small detachment of volunteers, sent to escort the supplies to Sandwich, was surprised and routed by a considerable force of Canadians and Indians. General Hull was prevailed upon later to send an additional force to bring the supplies into camp, and the Fourth Infantry, under the command of the youthful and gallant Lieutenant-Colonel James Miller, was reluctantly ordered upon the duty. Colonel Miller, before starting, briefly harangued his troops, saying: "And now, if there is any man in the ranks of this detachment who fears to meet the enemy, let him fall out and stay behind." None fell out. About 4 o'clock P. M., August 9th, the command reached the vicinity of Maguago, fourteen miles below Detroit. The advance guard, under the command of Captain Snelling, suddenly received from ambush a fierce volley from a mixed force of British, Canadians and Indians, under command of Major Muir of the English army and Tecumseh, the Indian chief. Snelling held his ground with what remained of his little force until the main body formed for the attack. The line moved forward with fixed bayonets and, although receiving a terrific fire from behind breastworks of fallen trees, charged the British and Canadians. Before they had time to reload, the first work was carried and the white men broke and fled, closely pursued by the American troops; the enemy was unable to form behind his second line of breastworks, and, completely routed, made the best of his way to the river and crossed to the other side. The Indians, thus deserted by their white allies, soon broke and

fled in their turn, disappearing in the forest. Colonel Miller determined to march at once on Malden, but at sundown he was met with a peremptory order from General Hull to return to Detroit. The loss to the Fourth Infantry was 58 killed and wounded.

On August 16, 1812, one week from the battle of Maguago, and with troops flushed and enthused with the success of that battle, General Hull basely surrendered his entire command, without a show of resistance, to less than its own numbers of British, Canadians and Indians. As one of the results of this base surrender, the regiment lost a beautiful stand of colors, presented to it by the ladies of Boston when it was stationed in the Eastern States.

The court-martial which tried General Hull found him guilty of "cowardice and neglect of duty," and sentenced him "to be shot dead and to have his name stricken from the rolls of the army." Clemency was recommended, and the President, mitigating the sentence, ordered that "the rolls of the army are no longer to be debased by having upon them the name of Brigadier-General Hull."

After the surrender the officers and men of the regiment were taken as prisoners of war to Montreal, Canada, suffering great hardships on the way from excessive ill-treatment and the want of even the plainest food. Arriving at Montreal on the evening of September 27, 1812, the regiment was met by crowds of people who had collected, as they said, "to have a peep at General Hull's exterminating Yankees." A band of music joined the escort and struck up the much admired ditty, "Yankee Doodle," in which it was joined by all the men who could whistle the tune. When they ceased to play, "Yankee Doodle" was loudly called for by the regiment. At last, mortified at their conduct, the band began "Rule Britannia," which was cheered by the multitude, but the men continued their favorite song, some singing and others whistling, till the barracks were reached.

From Montreal the regiment was sent to Quebec, and the men confined on board transports in the river. Many men died during their imprisonment from the ill-usage they had received. Finally the regiment was exchanged and sent from Quebec on October 29th on an old schooner bound for Boston. On the Gulf of St. Lawrence a furious storm was encountered, and the old schooner became the prey of the waves for several days. Land was finally made at Shelburne, on the east side of the Bay of Fundy. On the voyage thus far no less than fifteen men died and were buried at sea. Two more died at Shelburne, and before Boston was reached, on November 28th, thirty in all had been thrown overboard. Upon arriving in Boston General Boyd, the former colonel of the regiment, did everything in his power to make the men who had served under him at Tippecanoe comfortable.

Early in 1813 recruiting for the regiment began. The recruits were collected and the regiment assembled and organized, under the direction of Lieutenant-Colonel Darrington, at Greenbush, opposite Albany, New York. During the continuance of the war, the regiment served in the district including northern New York and Vermont. Such of the companies as had been organized participated in the battle of Chateaugay River, Lower

Canada, on October 26, 1813. In the following year detachments were present at the battles of La Cole Mill and at the siege of Plattsburg.

Upon the reduction of the army in 1815 many regiments were consolidated to give a smaller number of regimental organizations, and the Fourth Infantry was, with five other regiments, consolidated to form the Fifth Infantry. In the same way three regiments, the Twelfth, Fourteenth and Twentieth, were consolidated and called the Fourth Infantry. The official army register has for many years announced other regiments as forming the Fourth Infantry, but careful investigation shows that the Army Register is partially in error in this respect.

The War Department has ruled that by these consolidations, the distinguished services of the regiment prior to May 15, 1815, are to be credited to the Fifth Infantry, and that the Fourth Infantry, in a similar way, inherited the records of the regiments consolidated into its organization. The names Fort Niagara, Fort George, Beaver Dams, Chrystler's Fields, Chippeway and Cook's Mill are therefore borne upon the regimental colors, although in none of these battles did the regiment or any portion of it participate.

After the reorganization of the regiment it was ordered South, owing to difficulties with the Creek and Seminole Indians in Florida and Alabama. For several years its history was one of continual marching and countermarching, building cantonments and opening military roads through the wilderness, the policy of the general government then being that the *Infantry* arm of the service should build its own barracks and open roads through the Indian country.

In the spring of 1817 the regiment marched from South Carolina and Georgia to Alabama, and proceeded thence to Florida to operate under the command of Major-General Jackson, against the Spanish forces in Pensacola harbor.

It would be tedious and uninteresting to detail the many changes of station that occurred in the southern country during the distressing Seminole wars. Troops were changing and moving about continually, and when not moving were occupied in building quarters for their protection.

In 1831, the regimental headquarters were at Baton Rouge, La., and there seemed to be an intention to withdraw the regiment from its intermittent service in Florida.

The Black Hawk War began in 1832 and two companies were sent up the Mississippi to reinforce General Atkinson's command at Fort Crawford, Prairie du Chien, Wis. From Fort Crawford these companies returned to Fort Armstrong, Rock Island, Ill., and while at the latter place the cholera made its appearance among the troops. General Scott's characteristic order on the subject is still preserved among the records of the regiment, an extract from it reading as follows: "that every soldier or ranger who shall be found drunk or sensibly intoxicated, after the publication of this order, be compelled as soon as his strength will permit, to dig a grave at a suitable burying place, large enough for his own reception, as such graves cannot fail soon to be wanted, for the drunken man himself or some drunken companion. This order is given as well to serve as a punishment for drunk-

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enness, as to spare good and temperate men the labor of digging graves for their worthless companions."

Desertion from the army, as in more recent times, was not infrequent. Two years in the Leavenworth Military Prison, learning some useful trade, contrasts peculiarly with the following, not an isolated case: "The Court found him guilty as Charged and Sentences him to be tied to a stack of arms and to receive ten lashes for Five Successive Mornings with a Cat o' Nine Tails on his bare Back in presence of the command, to have his head and Eye Brows Shaved, to forfeit all pay and travelling expenses and to be Drumd out of Service."

The regiment made several changes of station to and from Florida, and finally returned to take part in the Seminole War of 1836. Rarely, if ever, have troops been called upon for service under such trying circumstances as in this war. The region in which the troops were compelled to operate consisted of swamps, overflowed thickets, and dense tropical forests of unknown extent. Poisonous insects and serpents under foot and an atmosphere reeking with fevers and disease overhead. The enemy to be subdued was cunning and active as he was cruel and treacherous. For days at a time the troops waded in the swamps or patrolled the streams in search of an enemy who only showed himself when in sufficient numbers to massacre isolated detachments. Treachery and deceit resulted from every conference with the Indians. The war was only temporarily brought to a close by the questionable seizure of Osceola under a flag of truce.

In all this war, which lasted about seven years and cost the Government hundreds of lives and millions of treasure, the Fourth Infantry bore an honorable part. It participated in nearly all of the engagements and lost severely in killed and wounded, and, what in that region was worse, in missing, the totals for the regiment being: Officers killed in action or died of disease, 6; men killed in action or died of disease, 128. December 20, 1835, Captain and Brevet Major Dade volunteered to command a detachment, consisting of two companies of artillery and eleven of the men of his own company, that had been ordered to proceed from Fort Brooke to Fort King, the Seminole agency. When about 55 miles on its way the detachment was attacked by a large force of Indians in ambush. The fight lasted from eight o'clock in the morning until the middle of the afternoon, December 28th. Three privates only escaped, and, though badly wounded, made their way back to Fort Brooke with the news of the massacre. On February 22, 1836, General Gaines, with a force including seven companies of the Fourth Infantry, arrived on the battle ground and buried the remains of Major Dade and his command.

General Scott's campaign which followed was not decisive and the next year there were great preparations for a campaign under General Thomas G. Jesup, Quartermaster General of the Army. Troops and supplies were gathered, and marching and countermarching began. The Fourth Infantry most of the time operated as an independent command. The movements during the winter resulted in bringing in the king, Micanopy, with a considerable number of his warriors. Campaigning then for a time ceased.

In 1837 there was "marching up and down, to and fro, hither and yon," and very little accomplished. On Christmas Day, however, one of the severest engagements in the war took place on the shores of Lake Okeechobee, Colonel Zachary Taylor, First Infantry, commanding. The six companies of the Fourth Infantry engaged lost an aggregate of 22 killed and wounded.

In May, 1838, the regiment was en route to the Cherokee Nation in Tennessee, in connection with the removal of the Cherokee Indians by General Scott. Then followed several years of peace, marked principally by severe labor and sickness incident to building roads, through a region so unhealthy that civilians could not be engaged to perform the work. In 1841 the fourth return to Florida took place, and a portion of the regiment took part in the final campaign of the Seminole War. But little skirmishing and few casualties from fighting occurred. The clothing and food supplies of the Indians were captured, and finally the chief, Halleck Tustenuggee, was taken prisoner by an artifice justified only by necessity. Soon after his capture the last of the warrior bands was removed from Florida.

In September, 1842, the regiment was ordered to take station at Jefferson Barracks, Mo., where it remained until the proposed annexation of Texas, in 1844, led to rumblings of war with Mexico. As a part of the "Army of Observation" the regiment was moved to Grand Ecore, La., where it remained until July, 1845, being moved thence to Corpus Christi, Texas, as a part of the "Army of Occupation." The first act of war on the part of Mexico was the murder, on April 10th, of Colonel Cross, assistant quartermaster-general, a few miles from camp, by a roving party of banditti. Lieutenant Porter, Fourth Infantry, with a small party, was sent out to search for the body of Colonel Cross, and on the return of the party it was ambuscaded, Lieutenant Porter and one man being killed. Soon after the Government recognized a state of war existing between the United States and Mexico, and preparations were made for an invasion of the territory of the latter.

When General Taylor's army reached the Rio Grande from Corpus Christi, General Mejia issued a pronunciamento: "The water of the Rio Grande is deep, and it shall be the sepulchre of these degenerate sons of Washington." Operations did not cease on account of this proclamation. The Army of Occupation, about noon of May 8th, met and engaged the Mexican army under General Ampudia at Palo Alto.

Early on the following morning the enemy retreated, and, about 3 o'clock in the afternoon, took up a position at Resaca de la Palma. The Fourth Infantry was deployed on the right of the road leading to his position, and at various points became briskly engaged, and finally, keeping as good order as the close chapparal would permit, charged and captured the camp where the headquarters of the Mexican general-in-chief were established. All his official correspondence was captured at this place, together with a large amount of ammunition, some 400 mules, saddles and every variety of army equipage.

At Monterey, the regiment consisted of but six reduced companies, four of which participated in the assault of the works in the lower part of the city

the first day of the battle. The regiment charged through a cross fire from the Black Fort and the batteries. A mistake in orders led to the charge, somebody had blundered, and about one-third of the men engaged in the charge were killed and wounded in the space of a few minutes. The regiment halted in a place of safety—what there was left of it. In a short time the advance began again and the troops reached the suburbs. A little battery covering the approaches to the lower end of the city was captured and turned upon another work of the enemy. An entrance into the east end of the city was now secured. An advance was made to within a square of the plaza, not without heavy loss, when the ammunition began to give out. Lieutenant Grant made a dashing and perilous ride back to ask that ammunition be forwarded. Before it could be collected the remnants of the two regiments, the Third and Fourth Infantry, returned. The following day the city capitulated.

Early in 1847 the regiment was ordered, as a part of the force sent from General Taylor's army, to proceed to Vera Cruz and join the army under General Scott. It arrived at Vera Cruz in March and participated in the siege of that place. By April 16th it had arrived at Plan del Rio, near Cerro Gordo, the battle of the latter place taking place on the 17th–18th. Previous to this battle General Santa Anna stated to his army: "I am resolved to go out and encounter the enemy. * * * My duty is to sacrifice myself, and I will know how to fulfil it! Perhaps the American hosts may proudly tread the imperial capital of Azteca. I will never witness such an opprobrium, for I am decided first to die fighting." The general encountered the American army at Cerro Gordo, and lost a leg in the retreat from that battle. Perhaps it may not be improper to state that it was the general's wooden leg that was lost in his hasty retreat.

After Cerro Gordo, the march into the interior was resumed and on May 14th the regiment arrived at Amasoque, 12 miles from Puebla. General Worth here ordered his command to clean up, to make a good appearance upon entering the city the next day. While the muskets were taken apart, and while the pipe-clay was drying upon the white belts, the long roll beat to arms. An immense column of Mexican cavalry was seen to be rapidly approaching. Duncan's battery was run out to meet it, and the regiment was hurried to support the battery. A few rounds of shell emptied many saddles and caused the column to diverge from the road. After the column had passed, the Fourth Infantry was posted as a picket guard several miles beyond Amasoque, in the direction of Puebla. A terrific tropical storm came up during the night and in a short time the corn field where the regiment was lying became a sea of mud. The nice uniforms, the white belts and the men who wore them were covered with Mexican mud, and probably the shabbiest looking regiment ever seen in the regular army was the Fourth Infantry when it entered Puebla on May 15, 1847. The azoteas, the windows and the streets were filled with men and women to look upon these "degenerate sons of Washington."

After Cherubusco, where the regiment pursued the fleeing Mexican troops to within a mile and a half of the City of Mexico, came an armistice of two weeks, then operations were actively resumed; Molino del Rey and

Chapultepec followed in quick succesSon. At Molino a storming party was organized, the regiment furnishing two officers and 100 men. The mill was carried at the point of the bayonet, but not without the loss of 11 out of the 14 officers who were in the storming party. The remnant of the detachment belonging to the Fourth Infantry joined the regiment in the final assault made in support of the storming party. A fierce and bloody hand-to-hand fight took place before the enemy was finally driven from his chosen position. The regiment lost during the day 67 in killed and wounded, including three officers. At Chapultepec, as at Molino, a storming party began the assault, to which the regiment furnished 50 men and 2 officers. Under a terrific storm of shot and shell the party reached the ditch and main wall of the great fortress, scaling ladders were brought up and amid hand-to-hand fighting a lodgment was secured, then, "long continued shouts and cheers carried dismay into the capital." Vigorous resistance was made by the enemy to the rapid pursuit after the fall of the castle; along the line of the great aqueduct and at the several garitás of the city the greatest resistance was encountered. Nothing could withstand the impetuosity of the troops, and by nightfall organized resistance ceased. A detachment of the Fourth Infantry had penetrated half a mile into the city and captured the adjutant-general of the Mexican army.

With the capture of the city active operations ceased. The remnant of the regiment remained for a time as part of the garrison of the city, removing on the gradual withdrawal of the troops to points on the Camino Real until in June, 1848, it was assembled at Jalapa for the return to the United States. Leaving Vera Cruz, the voyage home was short, Camp "Jeff Davis," Pascagoula, Miss., was reached July 23, 1848.

Thus ended the Mexican War for the Fourth Infantry, there having been but one important battle from the Rio Grande to the City of Mexico in which it did not participate.

It lost 8 officers and 59 men killed or mortally wounded; 10 officers and 140 men more or less severely wounded; 4 officers in addition lost their lives by steamboat explosions. In the language of General Grant, "the regiment lost more officers during the war than it ever had present in any one engagement," for during the greater part of the war the regiment had present but six reduced companies.

From Mississippi the regiment was ordered to proceed by sea to New York and there to take station at seven different points on the lakes, between Mackinac and Plattsburg.

Ordinary garrison duties were performed at the stations indicated until June, 1852, when the regiment was concentrated at Fort Columbus, N. Y. H., prior to a journey to the Pacific Coast. Between June 23d and July 4th, 393 recruits were received and assigned to companies. A telegraphic order on July 2d directed the regiment to embark on the Steamship *Ohio*, a vessel already bearing a full passenger list. In compliance with the order eight companies, with headquarters and band, sailed on July 5th from New York for Aspinwall. The *Ohio* was commanded by Captain Schenck, afterwards Admiral Schenck, U. S. Navy, and had all told on this voyage 1100 people on board. Aspinwall was reached on July 16th without

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incident, save the extreme discomfort of an overcrowded ship. The rainy season was at that time at its height on the Isthmus, and, what was infinitely worse, the cholera was raging.

The railroad across the Isthmus was completed only to Barbacoas, on the Chagres River. The troops proceeded by rail to that point and by boat to Gorgona, the families and baggage, with one company as a guard, proceeding to Cruces, the distance from the latter point to Panama being shorter than that to be followed by the troops. The roads were almost without bottom, and the contractor had failed to provide pack trains for tents and provisions, as well as for the heavy baggage from Cruces. The main body left Gorgona on July 18th at 1 P. M., struggling along through mud and rain until dark, when it halted and men and officers lay down on the water-soaked ground for the night. Many stragglers there were, and, as the vilest of liquor dens existed all along the route, the officers were kept busy in trying to prevent drunkenness and in gathering up stragglers.

The first case of cholera occurred on that first day's march. The second day was like the first, but it brought the column within eight miles of Panama, and early on the third day the men were safely on board the P. S. S. Co.'s steamer *Golden Gate*, Captain C. P. Patterson, U. S. N., subsequently Superintendent of Coast Survey, commander. The ladies had arrived earlier, but Brevet Captain Grant, R. Q. M., experienced the greatest difficulties in procuring the necessary transportation for the baggage and company remaining as the guard. Finally, after five days' waiting, he resolved to hire in open market, whatever the cost might be. Cholera appeared in the company acting as guard, men dying in six hours from the first symptom. Eight died before the company reached Panama. The disease appeared in an aggravated form among the troops on the *Golden Gate*. An old hulk was improvised as a hospital and the sick transferred to it. On Tuesday, the 27th, the disease began to subside. Upon the arrival of a small steamer in the evening of that day a dozen knapsacks, that had been left lying and moulding on the Isthmus, were received on board, and the men to whom they belonged seized and opened them to get a change of clothing. Some of these men were taken sick in the act; all were several hours thereafter taken violently with the cholera, and with only a few exceptions died. It was now determined to land all the troops, and accordingly both the well and sick were put ashore on Flamingo Island, the sick being in huts and the well in a few tents and shelters made from sails. The *Golden Gate* sailed on August 4th, but would only take 450 well people. One company (Auger's), the sick, and most of the women and children were left behind to be forwarded on the next steamer. The Chagres fever became epidemic on board the *Golden Gate* so that when the command arrived at Benicia, on August 17th, it was almost decimated. August 8th the Steamer *Northerner* took on board all but four men of Augur's company, who were left in the hospital, and sailed for San Francisco. The company arrived at Benicia August 26th. The total deaths from cholera, fever and allied diseases, from the time the regiment arrived on the Isthmus up to a few weeks after the arrival at Benicia, amounted to one officer and 106 enlisted men.

The two companies—A (Lieutenant D. A. Russell) and I (Haller's)—that had been left in New York, sailed November 18th on a naval vessel for San Francisco, via Cape Horn. After touching at Montevideo and Robinson Crusoe Island for fresh fruits and vegetables to avoid scurvy, the companies arrived at San Francisco June 7, 1853, seven months from the date of sailing.

After its arrival on the Pacific Coast the regiment was rapidly dispersed to many and widely distant stations, the headquarters going to Columbia Barracks, afterward Fort Vancouver, and now Vancouver Barracks, in September, 1852, where they with short absences remained until 1861. The following posts—Forts Vancouver, Reading, Humboldt, Dalles, Steilacoom, Jones, Boise, Lane, Yamhill, Orford, Townshend, Hoskins, Walla Walla, Crook, Terwaw, Cascade, Simcoe, Gaston, Chehalis, Yuma and Mojave,—extending from British Columbia on the north to Mexico on the south,—were all garrisoned, and the majority of them built, by companies of the Fourth Infantry, in the interval between 1852 and 1861. Three only of these posts are now occupied by United States troops; the others are abandoned.

Besides the numerous changes which the occupancy of so many posts necessitated, Indian campaigns were not infrequent. The most important campaign was that in Eastern Washington and Oregon in 1855-56 against Indians from many tribes under the able leadership of Chief Kamiarkin, a name now as unknown as the names Spotted Tail, Joseph and Geronimo will be a generation hence.

The vigorous campaign of Colonel Wright, and the summary punishments meted out by the military to all Indian offenders, brought about a peace that has remained unbroken by the greater part of the Indians in the Pacific Northwest to the present day. Humanitarian temporizing and treaty making had little to do with the opening and settlement of the vast region between the Rocky Mountains and the Pacific Coast. The only power that an Indian recognizes—uncompromising and unyielding force—was brought home to those of this region in such a way that it is not forgotten to this day, and the result has not been a detriment of the Indians.

In 1859, the movements of troops under the special and unusual instructions of General Harney, the Department commander, gave rise to the San Juan imbroglio. Three companies of the regiment were sent to San Juan Island to reinforce Captain Pickett's command and to secure exclusive jurisdiction over the island by force if necessary. There were five British men-of-war, carrying 167 guns and manned by 2140 sailors and marines, in the harbor. So great a preponderance of force in favor of the British, considered in connection with Captain Pickett's most positive assertions concerning his position, no doubt determined the British commander to await the coming of General Scott and the investigation he was ordered to make, as well as to wait for positive information from England upon the matter at issue. After General Scott's arrival, the question at issue, in this early forerunner of the Civil War, so far as the military were concerned, was speedily determined, and the companies of the Fourth Infantry were quietly withdrawn. During the stay of the troops the most pleasant relations ex-

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isted between the officers of the English fleet and the American officers on shore.

In the interval from 1852 to 1861 the Fourth Infantry contained as many distinguished and prominent officers as were ever associated together in one regiment. "The regiment was a home and all were proud of it." There is no need to comment on such names as Buchanan, Augur, Alden, Bliss, Grant, Sheridan, Judah, R. N. Scott, Hunt, Hodges, Wallen, D. A. Russell, Prince, Alvord, Kautz, Macfeeley, Crook and many others.

All were tried in the balance and not found wanting in the patriotism, wisdom and valor reposed in them. The names of many Fourth Infantry officers are indelibly woven in the web of our country's history, and so long as valor, honor and patriotism exist in our land, they will be among the names men most delight to honor.

At the outbreak of the Civil War, the regiment was stationed at ten different posts on the Pacific slope from Puget Sound to the Gulf of California. Remote as these stations were from the stirring events occurring in the east they were not without grave consideration of the results likely to follow the secession of the States. Many of the officers were of southern birth or family connection and as the clouds darkened all recognized that the time had come when each must determine for himself the path of duty and honor. If anything was wanting to emphasize the necessity for decision it was the order concentrating most of the companies at Camp Sumner, San Francisco, and the subsequent departure of the regiment for service in the east.

Of those officers on duty with the regiment or of recent service with it, five of junior rank resigned. They subsequently entered the Confederate service but none achieved distinction. The remainder of the officers, although some were of close southern affiliations and consequently under a considerable measure of suspicion, served faithfully and well, true to the flag and true to the regiment. If any served more honorably or more faithfully than the officers of the Fourth Infantry, all honor to them.

To a greater extent than other regiments, the Fourth Infantry suffered from the large number of officers detached for service with the Volunteers or duty in the staff departments. The enlisted strength also, due to the large bounties offered and the somewhat more agreeable service in the Volunteers, soon became reduced by the ordinary attrition of the service. It was only partially renewed at irregular intervals, and from the ten strong companies that crossed the Long Bridge on March 10, 1862, but five companies with 173 enlisted men were present at Gettysburg the next year.

The limits of this paper preclude more than the briefest chronicle of the service of the regiment during the Civil War. The history of the Regular brigade of the Army of the Potomac is the history of the Fourth Infantry, except for a brief time in 1864 when the regiment was attached to the 1st Brigade, 1st Division, 9th Army Corps.

From the trenches before Yorktown to Camp Lovell near Gaines' Mill, thence upon a reconnoissance to find Stonewall Jackson's corps and through the Seven Days' battle which followed his discovery. In the movement across the Chickahominy the regiment was the last to cross the already

partly destroyed "Grapevine Bridge." At Savage Station the train conveying the regimental records, baggage and supplies, was burned to prevent its falling into the hands of the enemy; and for nearly a week, officers and men had to eat and shelter themselves what they could forage. Arriving at Malvern the regiment was placed in the line of battle and sustained its position throughout the day and night. From Harrison's Landing to Acquia Creek, thence to Warrenton and through the second Bull Run battle and retreat to Arlington Heights. Then to Antietam, through the battle and return to Falmouth; then the Fredericksburg battle; followed later by the famous "Mud March" and return to Falmouth. This in turn was followed by the Chancellorsville campaign, where a hasty cup of coffee after severe duty on the skirmish line was interrupted by the 11th Corps in its hasty and unorganized retreat; then a return again to Falmouth and, after a brief time, on the march which terminated July 2d at Gettysburg. The remnant of the regiment participated in the battle about Round Top and shared in the losses of 50 officers and 920 men killed and wounded in the brigade having only 2500 men at the opening of the battle. After Gettysburg the retreating enemy was followed until, July 17th, the regiment reached Fayetteville, Va.; from thence it returned to the Rappahannock and Alexandria, thence to be ordered August 15th to New York to assist in suppressing the Draft Riots. A pleasant camp of three weeks in Washington Square was appreciated; as also the subsequent station at Forts Tompkins and Wood until April 25, 1864. Then ordered to the front, the regiment joined the 9th Corps near Alexandria and participated in the battle of the Wilderness, Spottsylvania, North Anna River, Tolopotomy Creek and their connecting skirmishes. In one of these latter when a skirmish line was falling back, the brigade commander gave the command, "Rally on the Fourth Infantry," a command not strictly according to the drill book but it answered its purpose. June 22, 1864, the regiment, now numbering but 134 men for duty, was ordered to City Point as guard to General Grant's headquarters. This duty it performed until the surrender of Appomatox. Then followed a tour of provost duty in Richmond and, July 15, 1865, a return to New York harbor. While stationed here a detachment with a number of officers was sent to West Point conveying the colors of the regiment, including some that had been carried in the Mexican War. The Corps of Cadets was paraded and joined the escort of the tattered and shot ripped flags to the Post Chapel where they were finally deposited.

From the harbor stations the regiment was ordered to occupy the Lake posts from Plattsburg to Detroit. In 1866 several companies participated in suppressing the Fenian Raid, capturing several car loads of warlike munitions. From the Lakes in March, 1867, the regiment was ordered for service on the plains in the Department of the Platte. Then followed a period of long marches, building of posts and cantonments, furnishing guards for constructing the Pacific railroad, and minor Indian troubles. The consolidation with the 30th Infantry came in 1869 with the companies widely separated at remote stations.

In 1871 orders directed the regiment to stations in Kentucky and the next year a change to Arkansas. A year and a half of civilization was fol-

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lowed by a return to frontier service in the Department of the Platte. Most of the posts from Omaha to Old Camp Brown were occupied at intervals until 1886. Every variety of service including the larger Indian campaigns of 1876 and 1879 was interspersed between the not always quiet and secure duties of garrison life.

In July, 1886, the regiment after 17 years service in the Platte valley, was ordered to Idaho and Washington where it has since remained occupying Fort Sherman, Fort Spokane and Boise Barracks.

Thus ends the chronicle. Let him who may point to more honorable and distinguished service faithfully performed.

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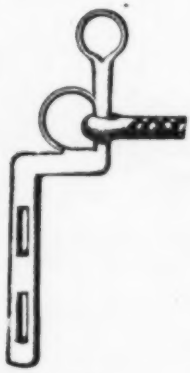

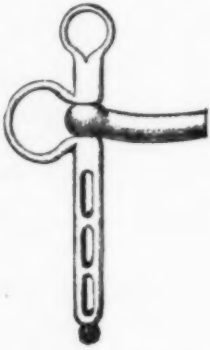

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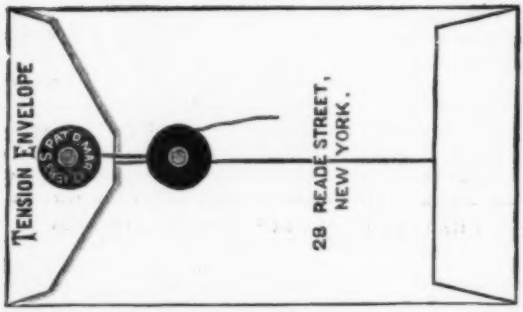

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